

THE EFFECTIVENESS OF USING E-JOBSHEET IN TEACHING MACHINE CONTROL SYSTEM PRACTICE

**Erwin Komara Mindarta*, Windra Irdianto, Fuad Indra Kusuma, Andika Bagus Nur
Rahma Putra, M. Ihwanudin**

State University of Malang, Indonesia

**Email: erwin.komara.ft@um.ac.id*

ABSTRACT

Jobsheet as a tool in practice that functioned as a tool for school and utilized by the learners. While e-jobsheet is the guidance for practice electronically. This study was conducted to help improve vocation student performance, especially fixing systems on the machine by Engine Control Module (ECM). Using the e-jobsheet as a Learning Source for 21st Century Students, hoping that students will be easier to understand the substance and learning outcomes so e-jobsheet is effectively implemented. This study used pre-experimental design with one pretest-posttest group. The population is all diploma 3rd students in the automotive machine of vocational education of Malang State University. Sampling is done by purposive sampling technique in student of 4th semester. The data retrieval technique in this research is done through the tests. Data analysis techniques in this study using the test "t" for two small samples of each other interconnected. The results show the observation = 7.14 > 1.83 = ttabel. Therefore, Ha is accepted and H0 is rejected, which means that there are differences in student learning outcomes before and after the implementation of e-jobsheet, and the value is significant. So, it can be concluded that the use of e-jobsheet in the practical learning on the practice of machine control system is effective.

KEYWORDS

e-jobsheet, practical practice, machine control system

INTRODUCTION

The paradigm shift of learning occurs from educator-centered learning to learner-centered learning so that passive learners become more active. Learning resources that rely on only one textbook have also begun to develop into learning from a variety of learning sources. One learning resource that can be optimized for the achievement of the process and the results of practice learning is jobsheet.

Effectiveness is a measurement in the terms of achieving predetermined goals (Bram, 2005). Rohmana (2012) explains that the effectiveness indicator in terms of the achievement of predetermined goals or objectives is a measurement where a target has been achieved in accordance with what has been planned. Effectiveness indicator in this research is the improvement of student learning result using e-jobsheet. So the researcher has a research question that is "are there differences in student learning outcomes before and after applied e-jobsheet?".

LITERATURE REVIEW

E-Jobsheet

The definition of jobsheet by Merriam-Webster (www.merriam-webster.com, accessed July 14, 2018) is "a page of instruction to a worker in performing a task - called also instruction card". Whereas, according to the Oxford dictionary (en.oxforddictionaries.com, accessed 14 July 2018), the jobsheet is "a document in which the details of one or more individual pieces of work are recorded". Jobsheet is used as a support tool in a practicum that is intended as a tool for school and used by learners. Jobsheet is used by participants at the time of practice to make it easier to do what is done in accordance with the predetermined instructions (Yahya, 2014).

As the development of Internet technology, e-jobsheet model also began to be developed, so the study and research are needed. The essence of e-learning is a form of conventional learning that is mix with digital format through internet technology. This system can be used in distance education or conventional education (Aryani, et al., 2014).

E-Jobsheet in this study is an electronic practice manual containing objectives, work order sequences, drawing component size specifications, examination results, and conclusions on the practice of machine control systems that have been implemented in the engine laboratory, Diploma 3rd students of the University Negeri Malang major in the automotive engineering.

Reasons researchers choose e-jobsheets, because they refer to the facts of learning and relevant research results which are: 1) students prefer to study in the environment offered by a computer (Agustini, 2013), 2) students feel bored and need an effective learning atmosphere and interesting, 3) students pay more attention to the smartphone when learning.

Improve Skills of Vocational Education Students

This research is important to help improve the skills of vocational education students, especially improving systems on machines by Engine Control Module (ECM). The results of the raw data obtained showed that the average score of students is less satisfied with the value (number) ranged from 45-76. This is in accordance with the statement of the lecturers who said that the above average score represents the student's skill that needs to be improved. Also, the student must be able to master the skill of machine control system within 2 weeks. By using e-jobsheet as Learning Resources for 21st Century Learners, hopefully, that students can more easily understand the substance of the subject lesson and the learning outcomes also increase so that e-jobsheet implementation is effective.

RESEARCH METHOD

This research uses pre-experimental design with one group pretest-posttest (Wardayani, 2016). The main characteristic of experimental research is the treatment conducted by researchers on the subject of research. Treatment functions as an independent variable. Researchers deliberately provide treatment on the subject of research to see the impact on the dependent variable (criteria). Thus, in this study, the independent variable is the utilization of e-jobsheet and the criterion variable is the result of student learning.

Its population is all Diploma 3rd vocational students of education of automotive machine of Malang State University. Sampling is done by purposive sampling technique in the fourth-semester students because the students of the fourth-semester are getting a course which is machine control system course. The technique of taking data in this research is done through the test instrument. Data analysis techniques in this study using the test "t" for two small samples of each other interconnected.

H_0 : There are no difference in student learning outcomes before and after e-jobsheet is applied.

H_a : There are differences in student learning outcomes before and after applying e-jobsheets.

RESEARCH RESULT AND DISCUSSION

After the research, the researchers used the "t" test for two small samples that were interconnected to test the hypothesis by performing the following calculation steps: 1) finding the mean of difference = MD meaning the average count of the difference between pretest score and posttest score, 2) look for standard error of mean of different (SEMD) that obtained, 3) find standard deviation (SDD) from difference between pretest score and posttest score, 4) calculate tobservasi and 5) do interpretation and draw conclusions.

Description of the test data "t" is designed in the form of the auxiliary table of the "t" test calculation for two small interconnected samples as seen from Table 1.

Table 1. Design Data Description Testing "t" student learning outcomes before and after applied e-jobsheet

Nomor Resp	Skor		D = (X – Y)	D ² (X – Y) ²
	Posttest (X)	Pretest (Y)		
1	96	86	10	100
2	94	76	18	324
3	94	72	22	484
4	92	72	20	400
5	92	76	16	256
6	90	82	8	64
7	90	78	12	144
8	90	78	12	144
9	88	82	6	36
10	84	78	6	36
Σ	910	780	130	1988

1. Mean of difference = M_D :

$$M_D = \frac{\sum D}{N} = \frac{130}{10} = 13$$

2. Standar Deviation (SD_D):

$$SD_D = \sqrt{\frac{\sum D^2}{N} - \left(\frac{(\sum D)}{(n)}\right)^2} = SD_D = \sqrt{\frac{1988}{10} - \left(\frac{130}{10}\right)^2}$$

$$= \sqrt{198,80 - 169} = \sqrt{29,8} = 5,46$$

3. Standard of error from mean of different = (SE_{MD}):

$$SE_{MD} = \frac{SD_D}{\sqrt{N-1}} = \frac{5,46}{\sqrt{10-1}} = \frac{5,46}{3} = 1,82$$

4. Observational results with the statistical formula:

$$t_o = \frac{M_D}{SE_{MD}} = \frac{13}{1,82} = 7,14$$

5. Interpretation and conclusion:

From result of calculation $t_o = 7,14$ and when consulted with value of table "t" at significance level 5% and $df = N - 1 = 10 - 1 = 9$ at 5% significance level $t_{table} = 1,83$. This results shows that $t_{observed} = 7,14 > 1,83 = t_{table}$. So it can be interpreted, accept alternative hypothesis (H_a) and reject the null hypothesis (H_0) which means that there are differences in student learning outcomes before and after applying e-jobsheets, and the difference is significant. So it can be concluded that the use of e-jobsheet on learning practice of machine control system, student of vocational education D3 of automotive engine of State Univeristy of Malang, effective.

6. Discussion:

The results of this study are consistent with the opinion of some experts who examine the effectiveness of the use of the worksheet and e-module on learning. Among them are 1) Aminatum, et al. (2016) conclude that android-based modules are effective in improving the thinking skills of learners; 2) Mufidah (2015) concludes that the use of job sheet construction fashion pattern is effective on the learning outcomes of courses construction of fashion patterns; 3) Muthohar & Gundo (2014) conclude that there is a difference in learning

outcomes of web programming lesson by learning using jobsheet, compared to learning without using jobsheet; 4) Sari (2013) concludes that the media worksheet is effectively used for the achievement of the competence of making men's shirt collar; 5) Aprilia (2016) concludes that there is effectiveness of the use of jobsheet media on the subject of making menswear with the subject of making pocket vest men's shirts; 6) Wardayani (2016) concludes that there is an increase in student learning outcomes given job sheets on "conscious" material; 7) Nopitasari & Purnama (2012) conclude that based on the calculation of coefficient of correlations and coefficient of determination, students' responses in the use of interactive jobsheet have a positive influence on the level of mastery of students in practicum; 8) Udayana, et al. (2017) conclude that the result of e-module implementation that has been developed has been successfully applied based on several tests conducted.

Jobsheet is designed to provide guidance and specifications for working on the overall activity. Jobsheet may include detailed briefings in verbal form and/or contains workmanship schemes, such as checking sensors in the machine control system course. According to Faison (1977), the use of images and graphics that are closely related to the subject matter and has a large size so that can easily be observed in a learning can provide maximum learning results.

Jobsheet is a medium used for students psychomotor skills because the worksheet contains steps to work on a practice. In addition, there are also illustrative illustrations in the worksheet to provide the same understanding between what the lecturer will deliver and which will be accepted by the students. Therefore the use of jobsheet only in the course of the machine control system is very effective to improve student learning outcomes because the machine control system is a material that is more emphasized on psychomotor ability.

While e-jobsheet is a practice manual electronically. E-jobsheets make students faster in learning engine control system course due to more students use digital technology in everyday life starting from the game to the other work tools. In addition, the development of software usage led to major changes in students' mindsets and learning styles. One of the phenomena that can be observed in this study is communication between students with lecturers. By using e-jobsheet, practice manual is put electronically, so 1) communication between student and lecturer do not have to face to face, 2) finding references do not have to come to the library, 3) learning process can be done remotely. The lecturer's role as a learning resource is not absolute, students can access the learning resources of e-jobsheets that are put electronically and can access other learning resources from anywhere through their smartphones. The learning process is more of a sharing to facilitate students to get their learning goals.

CONCLUSION

Through the results and discussion, it can be concluded that the use of e-jobsheet in computer system learning, Diploma 3rd education students automotive engineering at the State University of Malang is effective. E-jobsheets make students faster in learning engine control system course. The engine control system course is more focusing on psychomotor ability.

Suggestion

Suggestions for further developing products that have been produced through this research are presented below. 1) The use of appropriate media in learning can help students better understand the material, and attract the attention of students, so students don't feel bored or bored. 2) The use of e-Job Sheet media can be applied to improve student competence in other productive subjects

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