

Metacognitive Improvement of Project-Based Learning Students with E-Portfolio Assessment

Duwi Leksono Edy¹⁾
Mechanical Engineering Department
Universitas Negeri Malang
Leksono_duwi@yahoo.co.id

Suwarno²⁾
Mechanical Engineering Department
Universitas Negeri Malang
Suwarno.ft@um.ac.id

Sunomo³⁾
Mechanical Engineering Department
Universitas Negeri Malang
Sunomo.ft@um.ac.id

Basuki⁴⁾
Mechanical Engineering Department
Universitas Negeri Malang
Basuki.ft@um.ac.id

Abstract— Education is the main development in student psychology. The learning process has an important meaning in character formation. The continuous development of the character of students regarding thinking and developing mindset is the result of economic development. This research method uses Quasi-experiment. The study consisted of a control class and experimental class. Data analysis in this study uses the T-Test Test to see the different test results of learning activities with E-Portfolio assessment. The results of this study can be an average value of control class 59.55, while the experimental value is 79.25. Leven's Test test results that the assumptions of the two variants are not equal, with a value of $t = 15,857$ and a p-value (2-tailed) 0,000. While the p-value is smaller than the value of $\alpha = 0.05$, then H_0 is rejected. The results of different tests can conclude that there are differences in student learning outcomes that use E-Portfolio assessment and those that do not use E-Portfolio.

Keywords: *Metacognitive, Project-Based Learning, E-Portfolio*

I. INTRODUCTION

The development of education in Indonesia is a priority in the development of human resources. Education has a big role in character building and improving the economy of the community. Educational objectives need evaluation in the learning process which includes evaluation of learning outcomes, evaluation of the learning process, curriculum evaluation to improve the output and outcome of the activity of the learning process.

These government regulations can be assessed using several assessment instruments, such as the assessment of processes in the form of rubrics and assessment of results in the form of portfolios or design works.

The use of technology in the world of education is carried out to improve the efficiency and effectiveness of the learning process. For this reason, developing an electronic portfolio, from now on abbreviated as e-portfolio, is a digital collection of artefacts that represent individuals, groups, communities, organisations, or institutions [1]. The main use of portfolios in learning is to

record the performance and progress of students during the learning process [8].

E-Portfolio Assessment in the Project Based Learning process has an important role in the development of student character. This learning strategy that can help students to have creativity in thinking, problem-solving, and interaction as well as helping in investigations that lead to the resolution of real problems is Project-Based Learning (PBL) or project-based learning [7]. Project Based Learning can improve students' critical thinking skills. The use of Project Based Learning is known to be able to improve students' cognitive abilities in chemistry classes on functional group material. The application of the project method can also improve student achievement and student skills in physics learning when compared to lecture and discussion methods. [3,6].

The learning paradigm that shapes the character of students becomes the result of the learning process. The learning process influences the learning outcomes of a student. The student-based learning process with E-portfolio assessment will encourage students to think more creatively. The thinking ability of students to develop is the metacognitive ability of students in the learning process. Metacognitive abilities can help develop good thinking management skills. Metacognition as awareness and management of cognitive processes and products that a person has, or simply referred to as "thinking about thinking [4]. The development of a mindset that is owned by students is the first step in forming student character. The character of students in preparation for dealing with work. The character of students formed from the beginning becomes the result of this learning process.

II. RESEARCH METHOD

The research method used is Quasi-Experimental. The sample in this study consisted of a control class and experimental class. To reduce errors in this study, group divisions were carried out: (1) vocational education research class (2) carried out a different test of the average

(mean) pretest score to see the students' initial ability in the experimental class and control class (3) basic test for student's initial knowledge.

The population in this study is vocational education students who study welding. How to take samples from two classes, namely the experimental class and the control class. Each class of 27 control class students and 27 experimental class students. The whole research phase is like Figure 1.

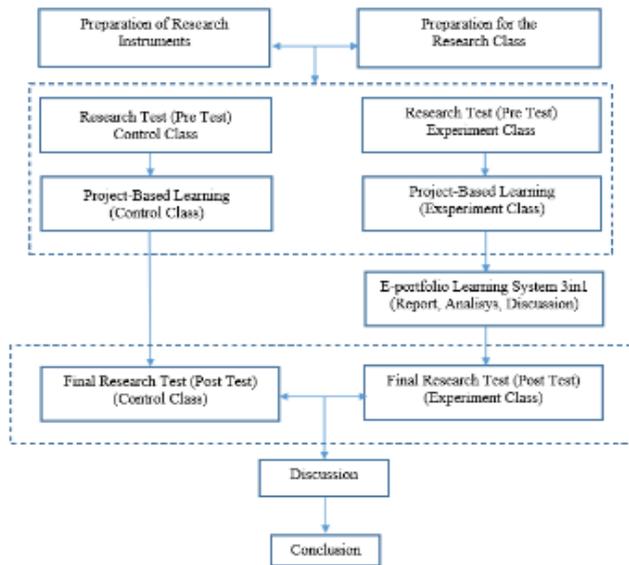


Fig. 1: Flow Chart in Research

Data in the form of scores from the results of the pretest and posttest. Student assessment criteria to see the ability of students in designing the results of the learning process and analyzing the results of project learning. The results of the assessment were tested using T-test analysis.

III. RESULT

Testing the results of different posttest and initial pretest ability using Project-based learning T-test with E-Portfolio assessment for experimental class and control class students to find out the hypothesis: H0, there is no difference in the results of posttest learning and the initial ability of pre-tests using E-Portfolio assessment and those that do not use E-Portfolio. H1, there is a difference in posttest learning outcomes and the initial ability of students pretest using E-Portfolio assessment and not using E-Portfolio.

Different test results of the experimental class and control class have an average value of 79.25 Experiment class; control class has an average value of 59.55.

Table 1: Posttest T-Test Results

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Post Test	Experiment_Class	27	79.2593	4.96598	.95570
	Control_Class	27	59.5556	4.12621	.79409

Leven's Test test results that the assumptions of the two variants are not equal, with a value of $t = 15,857$ and

a p-value (2-tailed) 0,000. While the p-value is smaller than the value of $\alpha = 0.05$, then H0 is rejected.

The results of different tests can conclude that there are differences in student learning outcomes that use E-Portfolio assessment and those that do not use E-Portfolio.

Table 2: Posttest T-Test Results

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means				95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Post Test	Equal variances assumed	.269	.546	15.857	52	.000	19.70370	1.24256	17.21033	22.19708
	Equal variances not assumed			15.857	50.312	.000	19.70370	1.24256	17.20834	22.19907

IV. DISCUSSION

Learning with E-Portfolio assessment can increase students' way of thinking in solving problems. Opinion metacognition is included not only by just thinking, but also all thinking skills are getting into at the same time. Individual's deciding on steps which he will do while he is working, developing an attitude about work, planning about work in his mind, reviewing his plan constantly and skills of constantly editing the disconnect points located into the concept of metacognition. In this process, individuals gain better control about thinking and feeling by reflecting and evaluating their thinking processes [2]. Metacognition, in the most sense, is defined as "thinking about thinking" [1]. Conclusions can draw from thinking students informed through sustainable activities. Thinking that is stimulated to can produce a mindset for more creative students.

V. CONCLUSION

From the results of the discussion in this study, conclusions can draw. First, project-based learning using E-Portfolio assessment can improve students' overall metacognitive abilities. The second point, learning with an E-Portfolio assessment with continuous assessment through problem-solving discussions can improve students' mindset in increasing the level of problem-solving analysis. Third, learning will be more creative and independent of students in the learning process.

REFERENCES

- [1] Anderson, N.J. (2002). The role of metacognition in second/foreign language teaching and learning. ERIC Digest. Washington, DC: ERIC Clearinghouse on Languages and Linguistics.
- [2] Demir, Ö. & Özmen, S.K. (2011). Üniversite ö Ğ rencilerinin üst bili Ğ düzeylerinin Ğ itli de Ğ I Ğ kenler aç Ğ ±s Ğ ±ndan incelenmesi. Ğ.Ü. Sosyal Bilimler Enstitüsü Dergisi, 20(3), pp.145-160
- [3] Johnson, Cynthia S., & Shannon Delawsky. (2013). Project Based Learning and Student Engagement. Academic Research International, 4 (4), 560 – 570.
- [4] Kuhn, D. (2000). Theory of Mind, Metacognition and Reasoning: A Life-span Perspective. In P. Mitchell & K. J. Riggs (Eds.). Children's Reasoning and The Mind (pp. 301–326). Hove, UK: Psychology Press.

- [5] Lorenzo dan Ittelson, 2005. An Overview Of Institutional E-Portfolios. Educause Learning Initiative. (Online),<http://net.educause.edu/ir/library/pdf/ELI3002.pdf>,
- [6] Muriithi, E.M., Odundo, P.A., Origa, J.O., & Gatumu, J.C. (2013). Project Method and Learner Achievement in Physics in Kenyan Secondary School. *International Journal of Education and Research*, 1 (7), 1-12
- [7] Rais, M. 2010. Project-Based Learning : Inovasi Pembelajaran yang Berorientasi Soft Skills. Disajikan Sebagai Makalah Pendamping dalam Seminar Nasional Pendidikan Teknologi dan Kejuruan Fakultas Teknik Universitas Negeri Surabaya 11 Desember 2010.
- [8] Yuanchun, Wenyin Liu dan Li, Shi-Qing (Eds.), *Advances in Web-Based Learning- ICWL Third International Conference Beijing, China, August 8-11, 2004 (Proceedings)*.