Letters in Information Technology Education (LITE)
Vol 1, No 1, 2018, pp. 18-21
e-ISSN: 2654-5667

The Effect of Laboratory Facilities and Teacher Competence on Student Learning Outcomes in Vocational High School (VHS)

Hakkun Elmunsyah[a,1,*], M. Rizza [a,2]
[a] Pendidikan Kejuruan, Pascasarjana-Universitas Negeri Malang
[1] hakkun@um.ac.id, [2] mohammadrizza91@gmail.com

Article Info

Article history:
Received: 14 January, 2018
Revised: March 21, 2018
Accepted: May 3, 2018

Keyword:
Laboratory facilities
Teacher Competence
Learning Outcomes

ABSTRACT

Learning in VHS cannot be separated from teacher's role as an educator. Besides that, the laboratory is necessary to support the life skill, critical and creative thinking, collaborating, communicating, and literacy. It can be concluded that there is a strong relationship between laboratory infrastructure (X1) and teacher competence (X2) on student learning outcomes (Y). The case study in this research known results as follows: (1) there are significantly impact between variable X1 and Y, (2) there are significantly impact between variable X2 and Y, (3) there are there are significantly impact between laboratory facilities and teacher competence with student's learning outcomes.

I. INTRODUCTION

Learning process in VHS cannot be separated from teacher's role as a facilitator to make an effective and efficient learning. Before teaching, teacher should make a systematically learning plan in order to be competent in learning process. Basically, learning process is an interaction pattern between student and teacher. Through learning, the student can understand, able, or can use something that they not understand before. In other side, teacher should help the student to advance the expectation.

The teacher should use any effort to improve the student learning quality. That is a responsibility of any teacher in order to produce a quality human resources. Therefore, the teacher should meet the requirement abilities to be a competent teacher. The abilities are; asking, strengthening, class management, lead a discussion, and explaining.

Getteng said that the teacher should believe that his professionalism is the first effort to reach the educational standard process (Getteng, 2011). The Law of the Republic of Indonesia Number 14 Year 2005 article 1 on Teachers and Lecturers explained that: "Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating learners in early childhood education, formal education, basic education, and secondary education " (Undang-undang Republik Indonesia Tentang Guru dan Dosen, 2005).

According to the explanation above, it can be concluded that the teacher should have a competencies involving pedagogic, personality, social, and professionalism through professional education. Teacher is a profession that need special ability in their job. This profession cannot do by the person who do not have a special ability as a teacher. The people who have a capability in a specific area cannot be said as a teacher. To be a teacher requires a special requirements. Moreover, as a professional teacher should be master in educational field with another scientific area through certain educational period.

Vocational High School is a school that is prepared to provide students with certain skills as a capital to face the working world. These preparation are shaping attitude, knowledge, and working ability so they can compete and be a professional labor. One of an effort to achieve that goal is practical learning that emphasizes the work ability for students. Therefore, the laboratory is a necessary place to the practical learning. Laboratory is a place where practical or research activities are demonstrated and guided by the infrastructure. According to Yoto, laboratory is an

infrastructure and work infrastructure that; (1) give an experience in practice skills, understanding, and insight in science and technology; (2) both factors and aspects principally can be controlled by the teacher (Yoto, 2015).

In the national education system law No. 20 of 2003 stated that educational facilities are regulated in Article 45 paragraph 1 “Each unit of formal and non-formal education provides facilities that meet educational needs in accordance with the growth and development of physical potential, intellectual, social, emotional, and learner responsibilities. In PERMENPAN no. 3 Year 2010, (Menteri Negara Pendayagunaan Aparatur Negara dan Reformasi Birokrasi Republik Indonesia, 2010) Laboratory is an academic support unit of educational institution. This facility systematically managed for limited testing, calibration and / or production activities, using equipment and materials based on certain scientific methods. It can be concluded that the laboratory is a supporting place to apply a theory such as the design, testing and analysis of an existing theory with facilities and infrastructure that have been adapted to certain functions and roles and managed by lecturers, teachers, and instructor.

Practical activities in the laboratory are used as a way for students to easily understand the material and can build knowledge by experiencing the process or experiment itself. Learning in VHS emphasizes the skills of learners who are prepared to work after graduation. Because in the era of the 21st century is needed a worker who has life skills, critical thinking, creative thinking, collaborating, communicating, and literacy. So the existence of the laboratory is very important to support learning in VHS. Based on the description, the problem arises about (1) How is the correlation between instrumentation and process automation laboratory with teacher competence on student learning outcomes SMKN 8 Malang ?; (2) Is there a significant influence between instrumentation and process automation laboratory facilities on student learning outcomes SMKN 8 Malang ?; (3) Is there a significant influence between teacher competence and student learning outcomes SMKN 8 Malang ?; (4) Is there a significant influence between instrumentation and process automation laboratory and teacher competence on student learning outcomes SMKN 8 Malang ?.

Hofstein and Naaman, suggested that the existence of laboratories in schools can support learning activities (Hofstein & Mamlok-Naaman, 2007). Laboratory of instrumentation and process automation are included in the industrial laboratory. Industrial electronics laboratory is a practical space of industrial electronics engineering programming program that serves as a place for learning activities: mechanical, electrical engineering, basic electronics, Industrial electronics laboratory is a practical space of industrial electronics engineering programming program that serves as a venue for learning activities: mechanical electrical engineering, basic electronics, manufacturing of industrial electronics circuits, and testing of control components, mechanical and magnetic controllers, hydraulic and pneumatic electrical controllers, electronic controllers PLC, and electronic system protection that controlled by instructor or educator (Menteri Pendidikan Nasional, 2008).

In Yoto, several functions of laboratory are mentioned: (1) to equip and apply the theory lessons so that between theory and practice are two relate things. (2) Providing scientific work skills for students; (3) improving ability to use the media tools to seek and discover the truth; (4) Fostering confidence as a result of acquired skills, (5) Helps improve professional knowledge and skills (Yoto, 2015).

The learning functions in the laboratory as follows: (1) Teaching a lesson that cannot be taught elsewhere; (2) Presenting and explaining teaching materials; (3) Developing psychomotor abilities; (4) Improving the ability to follow instructions; (5) Familiarize students with the practical equipment / instruments. (6) Familiarize students with designing and constructing experimental equipment; (7) Improving observational skills; (8) Improving skills / skills in collecting and interpreting data; (9) Improving ability to explain experimental results; (10) Improving the ability to write in a coherent and good and directed argument; (11) Improve self-study capability; (12) Encouraging self-reliance in thinking; (13) Stimulate deep thought about the interpretation of experiments; (14) Improve student expertise in problem solving with large variables and many possible solutions; (15) Encouraging initiative, effort, and empowerment of reason; (16) Increase personal responsibility and reliability to conduct experiments; (17) improve the ability to measure precisely and accurately; (18) increase confidence in the self-ability; (19) improve expertise; (20) Strengthen belief in the truths of theories; (21) Embedding the ability to design experiments and interpret the obtained data; (22) improve writing technical reports; (23) Satisfying students' curiosity; (24) Growing a scientific attitude and understanding through experimental investigation.

According to Rodliyah and Elmunsyah there is a positive influence of policy improvement of laboratory facilities on learning achievement, which means better laboratory facilities provide a better student learning achievement (Elmunsyah, 2014; Rodliyah, 2011). This is similar with Pamungkas mentioned that variable of computer laboratory facilities have a positive and significant effect on learning achievement (Pamungkas, Basori, & Efendi, 2018).

Teacher's competence is a combination of personal, scientific, technological, social, and spiritual abilities. That is literally establish the teacher professional standards competence, covering material understanding, learners understanding, educational learning, personal development and professionalism (Mulyasa, 2011). While Yamin explained that the competence of Teachers is the ability shown in fulfill its obligations to provide public education services. Teacher Competence covering personal ability, insight in science and technology, social, and spiritual field to face learners in learning process. A teacher must have the competencies as meant in Law No.14 of 2005 article 8 covering pedagogic, personality, social and professional competence through professional education (Undang-undang Republik Indonesia Tentang Guru dan Dosen, 2005).

According to Azzahra, there is a positive and significant influence between the teachers competence on student learning outcomes (Azzahra, 2015). It shows that the

competence of teachers is needed in the learning process in order to improve student learning outcomes. The Positive impact of teacher competence on student learning outcomes means that the better teacher competence will increase the student's learning achievement (Rodliyah, 2011). The teacher's competence simultaneously affect the student learning outcomes. More often teaching competence done by the teacher is expected to increase the learning outcomes (Astriyani, Gimin, & Hendripides, 2016).

According to Dimyati & Mudjiono, "learning outcomes are the result of a learning interaction and teaching action" (Dimyati & Mudjiono, 2009). In the learning process, student learning outcomes can be seen in the understanding of subject matter. Andersen et al, formulating an assessment of learning outcomes by educators on thinking skills are as follows: (1) remembering: re-explain what has been learned from teachers, books, other sources as originally without making changes; (2) Understanding; there is a modification process of the original form but the meaning of words, terms, writings, graphics, tables, pictures, photos do not change; (3) Implementing: using information, concepts, procedures, principles, laws, theories that already learned for something new; (4) Analyze: using the skill he has learned on an unknown information in grouping information, determining the relationship between one group information with other groups, between facts with concepts, between arguments and conclusions, and relationship between one work with another work. (5) Evaluate: determine the value of an object or information based on a criterion; (6) Creating: making something new from what already exists so that the result is a unified whole and different from the components used to form it (Menteri Pendidikan dan Kebudayaan Republik Indonesia, 2014). Furthermore he also formulates assessment of learning outcomes by educators on the dimensions of knowledge are as follows: Factual, Conceptual, Procedural, and metacognitive.

Krathwohl formulating assessment of learning outcomes by educators in the sphere of attitudes are as follows: (1) Accepting value (Menteri Pendidikan dan Kebudayaan Republik Indonesia, 2014): the willingness to accept a value and pay attention to the value; (2) Responding to value: willingness to answer a value and there is a sense of satisfaction in talking about the value; (3) Value appreciation: assumes good value, likes the value, and commitment to the value; (4) Living the value: put in the value as part of the self-esteem system; (5) Practicing value: developing that value as a feature of itself in thinking, saying, communicating, and acting) . The assessment of attitude in this research is done by observation. Assessment of attitude is according to the core competencies and basic competencies.

Simpson formulated assessment of learning outcomes by educators on abstract skills aspects of learning ability are as follows: observing, asking, collecting information, trying, reasoning, associating, and communicating (Menteri Pendidikan dan Kebudayaan Republik Indonesia, 2014). He also formulated assessment of learning outcomes by educators on aspects of concrete skills are as follows: (1) Perception: shows attention to perform an action; (2) Readiness: shows the mental and physical readiness to perform an action; (3) guided response: imitate mechanistic movement; (4) mechanism: perform mechanistic action; (5) Complex or overt response: perform complex and modified action; (6) origation: become an original action that difficult to imitate by others and becomes its trademark.

II. METHOD

In this research, the sample is a students of grade X majoring in mechanics and electronics of SMKN 8 Malang. The required data including completeness of laboratory instrumentation and process automation facilities (X1), teacher competence (X2) and learning outcomes (Y). The data collection are obtained by a questionnaire. Data collection of learning results through the results of the practical learning. Next, the data is analyzed by multiple regression test to know the effect of laboratory instrumentation and process automation facilities and teacher competence on student learning outcomes. The data analysis in this article is done with the assistance of SPSS 21.

III. RESULT AND DISCUSSION

Table I explains the correlation value of column R 0.88 which shows a strong relationship between laboratory instrumentation facilities and process automation and teacher competence on student learning outcomes. In the Durbin-Watson column has a value of 1.568 indicating the absence of autocorrelation.

This is reinforced by Rodliyah, there is a positive influence of laboratory facilities on learning outcomes (Rodliyah, 2011). Which means that the better laboratory facilities and teacher's competence in line with the student's learning outcomes. According Pamungkas, variable computer laboratory facilities have a positive and significant impact on learning achievement (Pamungkas et al., 2018).

Table II describes the level of significance about the effect of independent variables on the dependent variable partially and the value of regression equation coefficient. The values of (X1) Sig. of 0.809> 0.05, which means there is an influence between laboratory instrumentation facilities and process automation on learning outcomes. While the values of (X2) Sig. of 0.752> 0.05. which means there is an influence of teacher competence on student learning outcomes.

Table III describes the level of significance about independent variables affect on the dependent variable simultaneously. The significance value of 0.921 is greater than 0.05. This means that there is a significant and linear influence between (X1), (X2) and (Y). Because without inadequate of laboratory facilities then the student cannot reach the maximum learning outcomes. Also, the teacher's competence is affecting the student learning outcomes. Thus, it is necessary to have adequate laboratory facilities and good Teacher competence to improve student learning outcomes.

TABLE I. MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.088[a]	.008	-.087	1.69247	1.568

[a.] a. Predictors: (Constant), X2, X1

[b.] b. Dependent Variable: Y

TABLE II. COEFFICIENTS[A]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	*Std. Error*	*Beta*		
1	(Constant)	74.622	8.333		8.955	.000
	X1	.029	.117	.053	.245	.809
	X2	.029	.089	.070	.320	.752

[c.] a. Dependent Variable: Y

[d.] b. Predictors: (Constant), X2, X1

TABLE III. ANOVA[A]

Model	Sum of squares	df	Mean Squares	F	Sig.
1 Regression	.472	2	.236	.082	.921[b]
Residual	60.153	21	2.864		
Total	60.625	23			

[e.] a. Dependent Variable: Y

[f.] b. Predictors: (Constant), X2, X1

IV. CONCLUSION

Based on the result it can be conclude that (1) there are strong relationship between laboratory facilities and teacher's competence on student's learning outcomes with value of column R is 0.88; (2) there are significance impact between laboratory facilities on student's learning outcomes with value of Sig. 0.809 > 0.05; (3) there are significance impact between teacher's competence on student's learning outcomes with value of Sig. 0.752 > 0.05; (4) there are significance impact between laboratory facilities and teacher's competence on student's learning outcomes in SMKN 8 Malang. The significance value is 0.921 which greater than 0.05.

References

Astriyani, A., Gimin, G., & Hendripides, H. (2016). Pengaruh Kompetensi Mengajar Guru dan Fasilitas Belajar terhadap Hasil Belajar Siswa di SMA Negeri 7 Bintan Desa Numbing Kecamatan Bintan Pesisir Kabupaten Bintan. *Jurnal Online Mahasiswa Fakultas Keguruan Dan Ilmu Pendidikan Universitas Riau*, *3*(1), 1–13.

Azzahra, A. F. (2015). *Pengaruh kompetensi guru terhadap hasil belajar siswa pada mata pelajaran IPS di SMP Plus Al-Kautsar Malang*. Universitas Islam Negeri Maulana Malik Ibrahim.

Dimyati, D., & Mudjiono, M. (2009). *Belajar dan Pembelajaran*. Jakarta: Rineka Cipta.

Elmunsyah, H. (2014). A national education policy-based ICT model for Indonesian vocation1al high schools (VHS). *Global Journal of Engineering Education*, *16*(3), 136–140.

Getteng, R. (2011). *Menuju Guru Profesional dan Ber-Etika*. Yogyakarta: Pustaka Pelajar.

Hofstein, A., & Mamlok-Naaman, R. (2007). The laboratory in science education: the state of the art. *Chemistry Education Research and Practice*, *8*(2), 105–107.

Menteri Negara Pendayagunaan Aparatur Negara dan Reformasi Birokrasi Republik Indonesia. Jabatan Fungsional Pranata Laboraturium Pendidikan dan Angka Kreditnya (2010). Indonesia.

Menteri Pendidikan dan Kebudayaan Republik Indonesia. (2014). Penilaian Hasil Belajar oleh Pendidik pada Pendidikan Dasar dan Pendidikan Menengah. Retrieved June 4, 2015, from http://pgsd.uad.ac.id/wp-content/uploads/lampiran-permendikbud-no-104-tahun-2014.pdf

Menteri Pendidikan Nasional. Standar Sarana dan Prasarana Sekolah Menengah Kejuruan/Madrasah Aliyah Kejuruan (SMK/MAK) (2008). Indonesia.

Mulyasa, M. (2011). *Standar kompetensi dan Sertifikasi Guru*. Bandung: Remaja Rosdakarya.

Pamungkas, D. S., Basori, B., & Efendi, A. (2018). Pengaruh Minat Belajar dan Fasilitas Laboratorium Komputer Terhadap Prestasi Belajar Mata Pelajaran Melakukan Instalasi LAN Di SMK Negeri 1 Sawit. In *Prosiding Seminar Nasional UNS Vocational Day*.

Rodliyah, B. (2011). *Pengaruh Fasilitas Laboratorium Komputer dan Kompetensi Guru Terhadap Hasil Belajar Siswa Kelas X AP SMKN 9 Semarang*. Universitas Negeri Semarang.

Undang-undang Republik Indonesia Tentang Guru dan Dosen, Pub. L. No. 14 (2005). Indonesia.

Yoto, Y. (2015). *Manajemen Bengkel Teknik Mesin*. Malang: Aditya Media Publishing.