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The Feasibility of Practice Facilities for Lathe Training Based on Standard

Dwi Rahdiyanta¹, Hestu Pramana¹, Aris Eko Wibowo^{1, a)}, and Alifia Zahra Khoirunisa²

¹*Department of Mechanical Engineering Education, Universitas Negeri Yogyakarta, Indonesia*

²*Graduate School, Universitas Negeri Yogyakarta, Indonesia*

^{a)}Corresponding author: arisekowibowo@uny.ac.id

Abstract. Increasing the competence of graduates of course requires adequate facilities and infrastructure, especially practical tools in accordance with the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System. Therefore, the purpose of this study was to measure the feasibility of practicum facilities and the level of competence of class XI students of Mechanical Engineering at SMK Muhammadiyah 1 Bantul. The results can be used as evaluation material by schools or foundations. This study used a descriptive method with a quantitative approach which is then described qualitatively. The subject were teachers of lathe subject, head of the Mechanical Engineering Department. The research objects included: the feasibility of buildings, furnishings, equipment, instructional media, and other devices as well as the level of competence of students' lathes. Data collection used observation, interviews, and documentation technique. The instruments used were observation instrument sheets and interview instruments. The data analysis technique used descriptive statistical analysis technique. Based on the results of the research that has been done, the feasibility of the lathe machining workshop facility at SMK Muhammadiyah 1 Bantul reached 72.5% so that it was included in the feasible category to support the formation of students' lathe competencies. The mean score of participants in the lathe subject was above the Minimum Graduation Criteria (MGC). This means that the competency standard for turning students of class XI Mechanical Engineering at SMK Muhammadiyah 1 Bantul has been achieved. Similar research is needed for other competencies that must be fulfilled by vocational students in the field of Mechanical Engineering so that they can be used as evaluation materials to improve the competence of graduates who are ready to face the Industrial Revolution Era 4.0.

INTRODUCTION

The development and provision of human resources is one of the responsibilities of the national education sector, the education sector is required to shape students into subjects who have an important role in showing themselves as competitive, independent, creative, and professional in their fields [1]. To produce competent and high-quality graduates who are able to compete nationally and internationally, it is necessary to have a standard as a reference for educational institutions in the implementation of teaching and learning activities.

National Education Standards serve as the basis for educational supervision, implementation and planning in the context of realizing quality national education. In accordance with the National Education Standards contained in Government Regulation No. 13 of 2015 [2], there are 8 aspects that must be met to maintain the quality of national education, namely: content standards, process standards, graduate competency standards, standards of educators and education personnel, standards of facilities and infrastructure, standards of management, standards of financing and standards of education assessment.

Improving the competence of graduates certainly requires adequate facilities and infrastructure, especially practical tools as learning facilities according to the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System [3]. Practice itself is an embodiment of a theory in the form of real work or an application of work based on a certain theory [4].

Then, especially regarding the standard of infrastructure for SMK, it is regulated in Minister of National Education Regulations, Number 40 of 2008 concerning Standards for Facilities and Infrastructure for Vocational High Schools/Vocational Madrasah Aliyah (VHS/VMA)[5]. The quality of human resources is an absolute requirement to increase development in a country. From this, the government encourages the government to make competency standards that must be possessed by graduates at every level of education.

Government Regulation Number 13 of 2015 states that graduate competency standards are qualifications of graduates' abilities that include attitudes, skills, and knowledge. Competence is the knowledge, attitudes, and skills possessed by students after going through a learning process[2]. According to [6], Competency standards are statements about knowledge, attitudes and skills that must be mastered after following a process of learning subjects in certain educational units. Meanwhile, according to [7], competence itself is an ability to do or carry out a job that is based on knowledge and skills and is supported by a good work attitude.

Vocational High School as one of the educational service providers that has an important role in improving quality human resources, preparing students to become skilled workers and ready to compete, equipped with skills and knowledge that are qualified in a particular field of expertise. In accordance with the opinion of [8] which states that SMK is an educational institution to create human resources who have skills in accordance with certain fields of expertise and aim to develop the skills of students to become job-ready candidates. The purpose of vocational education is to prepare human resources to work according to their fields of expertise professionally, but what happens is that the link and match between vocational schools and industry has not been effective. Alignment between the dimensions of quality, quantity, location, and time has not been formally organized [9].

VHS Muhammadiyah 1 Bantul is one of the vocational schools in Bantul Regency that has Machining Engineering Expertise Competence, because in Bantul Regency itself there are still few SMKs that have Machining Engineering Expertise Competencies. This is certainly a challenge in itself to be able to create competent graduates, especially in the field of Mechanical Engineering. So, to support the learning process, it is necessary to pay attention to educational facilities in the form of furniture and learning media in schools both in terms of procurement and or comfort of use.

Based on the results of initial observations and interviews conducted during the School Field Introduction Program at SMK Muhammadiyah 1 Bantul, it showed that students' interest in learning practice was higher than when learning theory. Students still have difficulty in reading working drawings and also in making work preparation. The practice atmosphere is also sometimes not conducive. The level of feasibility of the lathe practice facility is not yet known. The number of students who practice lathe is 15 people, the number of lathes in the machining workshop of SMK Muhammadiyah 1 Bantul is 16 units with a description of 3 damaged units, 5 units of lathes can.

METHOD

This research used quantitative descriptive research, then it was redefined using qualitative. The purpose of the research is to describe an object and obtain information in the field and then describe it according to the data in the field. This research was carried out at SMK Muhammadiyah 1 Bantul within a period of 1 month starting from November to December 2020. The target or object in this research was the workshop for lathe practice at SMK Muhammadiyah 1 Bantul consisting of lathe workshop building, furnishings, lathe equipment, learning media, other equipment. The research subjects included the Head of the Machining Engineering Expertise Competency and the Lathe Subject Teacher

The validity of the data was guaranteed by triangulation of data collection techniques, namely observation, interviews and documentation. The data obtained was then analyzed and used to draw conclusions or results. Observation used three stages, namely describing everything that was seen, felt, at this stage it had not brought the problem to be studied. Reducing was making small observations, to focus on certain aspects. In the last stage, the selection was already breaking down the focus and detailing the data that has been owned, here it was already possible to find the problems to be studied, regarding contrasts, differences or similarities between categories. The observations carried out had a target, namely the lathe machining workshop. This observation aimed to determine the feasibility of facilities and infrastructure for lathe practice which included: buildings, furnishings, media and other equipment. The data collection uses an observation instrument that refers to Minister of National Education Regulations, Number 40 of 2008[5].

The interview used was an open interview technique. The open interview technique was used so that the research subjects were free to answer according to their thoughts. Interviews were used to collect data about the condition of the lathe machining practice room, infrastructure facilities in the lathe machining practice room, and learning

activities for lathe machining practices. The subject of this research interview was the Head of the Department of Mechanical Engineering and the Teacher of Lathe Subjects

Documentation was used to determine the variable mastery of student competencies by taking data on the scores of lathe machining subjects from semester one to semester two and analyzing the job sheet of the lathe practice used. Documentation was carried out to capture data obtained in the field, data obtained by documentation in the form of data on the scores of lathe machining subjects and also in the form of images as supporting data.

The data analysis technique used was descriptive quantitative which is then translated back into qualitative. The results of observations are assessed based on 4 criteria which can be seen in Table 1.

TABLE 1. Feasibility Criteria [10]

Definition	Feasibility Criteria	Score
Very feasible	76 % - 100 %	4
Feasible	51 % - 75%	3
Less feasible	26% - 50%	2
Not feasible	0 % - 25 %	1

Documentation results from student subject scores on lathe are then processed to obtain mean scores, for each class. The mean score can be used to determine the criteria for the level of competence of students. The standard of graduation criteria can be seen in Table 2.

TABLE 2. Minimum Graduation Criteria [11]

Score Range	Achievement Criteria
78 – 100	Competent
< 78	Not competent

RESULTS AND DISCUSSION

Feasibility of Lathe Workshop Area

The result of measuring the area of the lathe workshop at VHS Muhammadiyah 1 Bantul is 104 m² so that it gets a score of 4 and is in the very feasible category. The capacity is 6.5 m²/student so that it gets a score of 1 and is included in the not feasible category.

Feasibility of Furnishings

Observations in the lathe workshop area did not find work desks and work chairs for students. The available work desks and work chairs are only available for instructors/teachers. If referring to Minister of National Education Regulations, Number 40 of 2008 [5], then the assessment of work desks and work chairs gets a score of 1 because they do not meet the applicable standards. The availability of storage cabinets for tools and materials is very sufficient because there are already 3 cabinets so that it gets a score of 4, in the very feasible category.

Feasibility of Lathe Workshop Equipment

Observations found that the number of practical tools in the form of lathes was 16 units. 10 of them are in good condition, 3 of them are lightly damaged and 3 of them are heavily damaged. During practical learning, 1 lathe is used by 1-2 students. The ratio of the machine and the number of students, which is 1:2, is in accordance with the standard. 1 set of toolboxes is used for 1-2 students. Thus, the ratio of the number of machines and the adequacy of the toolbox each get a score of 4, in the very feasible category.

Feasibility of learning media

The results of the observations showed that the educational media in the form of whiteboards in the workshop of lathe practice was 1 piece with good condition but lack of maintenance. Thus, the educational media in the form of a blackboard got a score of 3, in the feasible category.

Feasibility of Other Equipment

The work area equipment in the form of electrical contacts in the lathe workshop of SMK Muhammadiyah 1 Bantul is very good. Because in addition to the central electrical contact, each lathe also has its own electrical contact which is used to open and close the flow of electricity to the machine. So, for electrical contacts get a score of 4 and enter the very feasible category. As for the dustbin in the practical workshop, there are 2 pieces, but the conditions are not well maintained so that they get a score of 3 and are in the feasible category.

Student Competency

The results of the documentation of the scores of the lathe lesson data show that the grade XI students in Mechanical Engineering at VHS Muhammadiyah 1 Bantul are above the Minimum Completeness Criteria. Thus, it can be said that students are competent. The mean, median and mode of the students' scores can be seen in Table 3.

TABLE 3. Lathe Practice Scores of Grades 11 Students'

Result	Group 1		Group 2		Group 3	
	Semester 1	Semester 2	Semester 1	Semester 2	Semester 1	Semester 2
Mean	79,06	82,40	78,65	82,58	78,38	81,72
Median	78,93	82,39	78,33	82,75	79,00	81,48
Modus	82,70	84,83	77,83	83,28	79,67	81,22

The overall lathe practice facilities are in decent condition (see Table 4) and the mean score of the lathe subjects shows that the students are competent. Some things such as capacity building, work desks and work dies are still not feasible, but the fact is that in the lathe practice process students work with machines and are required to stand while operating the machine, so there is no need for a work desk and work chair. This proper tool for lathe practice may be related to the level of competence of the students' lathe. Adequate and proper practice facilities make the practical learning process in schools can be carried out well. Students will more easily develop their competencies when the environmental conditions support the learning process. When the level of competence of students is still low, there may be problems with the means of supporting the learning process.

TABLE 4. Summary of Feasibility of Lathe Practice Facilities

Facilities	Type	Score	Feasibility
Building	Workshop area	4	Very feasible
	Building capacity	1	Not feasible
Furnishings	Storage cabinets	4	Very feasible
	Work desks	1	Not feasible
	Work chairs	1	Not feasible
Lathe workshop equipment	Adequacy of the lathe machine	4	Very feasible
	Adequacy of the toolbox	4	Very feasible
Learning media	Whiteboards	4	Very feasible
Other equipment	Electrical contact	4	Very feasible
	Dustbin	3	feasible

CONCLUSION

The condition of the workshop used for learning and the level of competence, but the students were observed objectively. Practical workshop facilities and infrastructure in the lathe work area which included buildings, furniture, lathe equipment, learning media and work equipment at VHS Muhammadiyah 1 Bantul were included in the appropriate category to support the formation of students' lathe competencies. The average score of 11th graders in group A, group B, and group C at SMK Muhammadiyah on the lathe subject is above the Minimum Completeness Criteria score. This means that the competency standard for turning students of class XI Mechanical Engineering at SMK Muhammadiyah 1 Bantul has been achieved. Continuous improvement needs to be done on damaged machines, trash cans, and workshop capacity. Similar research is needed for other competencies that must

be met by vocational students in the field of mechanical engineering so that they can be used as evaluation materials in order to improve the competence of graduates who are ready to face the Industrial Revolution Era 4.0.

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