

The Feasibility Level of The Infrastructures and Facilities of the Vocational Engineering Workshop in Palembang

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Abstract

The study aimed to analyze the feasibility level of workshop infrastructures and facilities in the mechanical engineering specialization program of Vocational High School (SMK) in Palembang city, South Sumatera, Indonesia. The research employed a quantitative descriptive approach. The data collection was carried out by interview, observation, and documentation techniques. The subjects of this study were the head of expertise competency and 2 teachers of the engineering expertise program. The result showed that the percentage of the feasibility of facilities and infrastructure for the workshop of the mechanical engineering study program of SMK in Palembang City. They included SMK N 2 Palembang with the percentage of feasibility was 78,13%, SMK N SUMSEL was 85,37%, SMK PGRI 2 Palembang 67,74% and the last SMK YP Gaja Madah is 70,07%. Hence, it can be concluded that the vocational high school (SMK) workshop facilities in Palembang are categorized as good. The reasons for not reaching the 100% percentage are due to several factors, including inadequate standard of school facilities and infrastructure, inadequate maintenance, incompetent teaching staff, and limited financial support.

Keywords

feasibility level, infrastructures and facilities, mechanical engineering workshop, vocational high School.

1. Introduction

The type of learning model in 21st-century learning is learning designed for the 21st-century generation where the cutting-edge technology in the flow of communication and information develops rapidly to affect all elements of life. Due to its significant influence, students are expected to be able to adapt to the era so that they can compete in the near future (Daryanto, 2017).

The definition of education, in general, is the process of teaching knowledge, skill, or habit from one generation to another under the guidance of someone directly or self-taught (self-learning). education is an effort that is deliberately chosen to influence and help children to improve knowledge, body, and morals so that it can slowly lead children to their highest goals and ideals. To have a happy life and what he does can benefit himself, society, nation, country, and religion(Langeveld, 2006).

UNESCO (*United Nations, Educational, Scientific and Cultural Organization*) as the world educational institution have launched 4 (four) pillars of education, comprising of (1) *Learning to know*, (2) *Learning to do*, (3) *Learning to live together*, and (4) *Learning to be*. The four pillars of education are then employed as a benchmark for the implementation of education around the world including Indonesia (Shofwan et al. 2021). Those pillars according to UNESCO are considered fit to realize the real objective of education. The pillars of each other are interconnected and supportive so that they become one unity. If understood correctly, education is not only transferring knowledge to students but also how to apply the knowledge to develop its potential so that it is able to live in a wider and diverse environment (Wulandari et al., 2020).

Recently, today's world has shifted to the era of industrial revolution generation 4.0 marked by increased connectivity, interaction, and development of digital systems, artificial intelligence, and virtual. With the increasing convergence of boundaries among humans, machines, and other resources, information, and communication

technology certainly have an impact on various sectors of life. One of them is the impact on the education system in Indonesia. To face the era of industrial revolution 4.0, education is needed to able to form a creative, innovative, and competitive generation. This can be achieved by optimizing the use of technology as an educational tool that is expected to produce outputs that can follow or change the times for the better (Nwakanma & Lilian, 2020). Without exception, Indonesia also needs to improve the quality of graduates following the market demand and digital technology. Education 4.0 is a response to the needs of the 4.0 industrial revolution in which people and technology aligned to create new opportunities creatively and innovatively (Savitri Astrid, 2019).

Government Regulation No. 40 of 2008 contains all minimum standards of practice space in concrete construction engineering skills program, namely (1) Minimum area of practice space, (2) Student ratio, (3) Space capacity, (4) Storage and instructor space area, (5) Furniture for practice room, (6) Equipment in the practice room, (7) Educational media in the practice room, and (8) Other equipment in practice (Peraturan Pemerintah, 2008). Based on observations made in 5 vocational schools in Palembang city, *Permendiknas* Law No. 40 of 2008 has not run to the maximum, this can be seen from the standard of inadequate school facilities and infrastructure, incompetent teaching staff, and limited financial resources. This is due to the transfer of authority from the district government to the provincial government. Certainly, this is also contrary to the theory of Arifin that the workshop facilities can be said to be feasible if they meet several requirements such as furniture, equipment, educational media, and other equipment (N A Y Pambayun, 2020), (Mulyana, 2019), (Suyanta et al., 2019).

Consequently, the appropriate minimum standard of space, the practical activities carried out will be maximized. Therefore, researchers are interested in conducting further research on the feasibility level of machining engineering facilities and infrastructure in Palembang, which is hoped that the research results obtained can provide additional insights that can be used as a reference by the government and schools in providing facilities and infrastructure and maintenance of practice classrooms.

2. Literature Review

The term educational facilities have wider range meanings of the dictionary definition term states that educational facilities include buildings used for the development of student learning, both public and private schools, as well as vocational schools. While the legal dictionary identifies that educational facilities as facilities that students can use to develop their potential, and educational facilities include buildings, fixtures, and equipment that are essential for the effective and efficient implementation of an educational program (B.N, 2012), (Setiawaty, 2015)

Based on the educational infrastructure etymologically (meaning the word), infrastructure means indirect tools to achieve the goal. In education, for example, location or place, school building, sports field, money, and so on. While such means are direct tools to achieve educational goals. For example rooms, books, libraries, laboratories, etc (H. M. Daryanto, 2011).

A workshop or so-called "shop" or "workshop" is a place used for practicum and production. Indonesia Dictionary explains the understanding of workshops as a place to practice, as well as organizing activities with clear directions and objectives. A laboratory/workshop is a room equipped with special equipment to conduct experiments, investigations, and. According to Sukardi, Workshop is a means of educational institutions that are used to foster and improve knowledge skills to reach a professional level (Emda, 2017).

According to Sukardi, Workshop is a means of educational institutions that are used to foster and improve knowledge skills to reach a professional level (Sukardi et al., 2013). One of the constraints of achieving educational goals is the lack of facilities and maintenance of facilities by schools or educational institutions. The lack of facilities and maintenance of facilities in schools resulted in gaps between schools. All physical facilities including human resources play a role in supporting the teaching and learning process in (Kapinga, 2017), (Smithson et al., 2015).

Management is a system which includes planning, organizing, directing, coordinating, and controlling to achieve certain goals in educational institutions. Some Opinion that equipment management will only be done to count the number of workshop equipment that is entered and left or is used. Tool management is seen as a waste of time, effort, and cost (Owo & Ajie, 2020), (Audu et al., 2013). Procurement of workshops is not cheap and requires a lot of money so that equipment management is a step that must be taken, it can be conducted by manual management written in books or programmed with a computerized and scheduled program as a productive learning effort. If the management of workshop equipment and materials in vocational education goes according to the planned objectives, it is hoped

that the workshop manager can manage the available workshops properly (Ardian et al., 2020), (Kustono et al., 2020). Therefore, the management of a workshop / laboratory is an important part, especially in vocational education practice (Bakri & Zakaria, 2018), (Njati, 2016)

Government Regulation No. 40 of 2008 contains all minimum standards of practice space in concrete construction engineering skills program, namely (1) Minimum area of practice space, (2) Student ratio, (3) Space capacity, (4) Storage and instructor space area, (5) Furniture for practice room, (6) Equipment in the practice room, (7) Educational media in the practice room, and (8) Other equipment in practice (Peraturan Pemerintah, 2008).

3. Methods

This study uses descriptive quantitative data analysis techniques and the presentation of data using percentages (John W. Creswell., 2012). as for the procedures in the study can be seen in the figure 1. Research Procedure

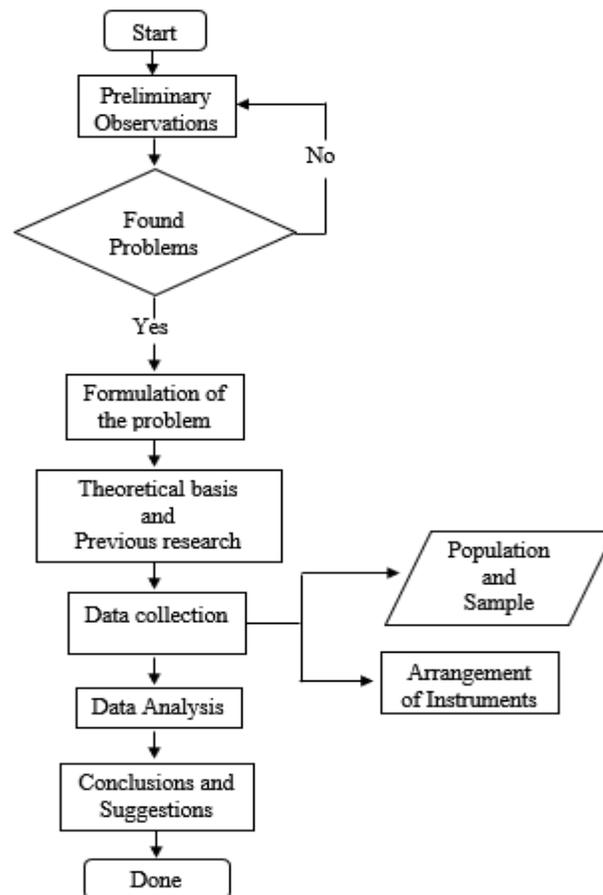


Figure 1. Research Procedure

Based on the explanation above, the first research procedure can be explained star, preliminary observations, found problems, formulation of the problem, theoretical basis and previous research, data collection, population and sample, arrangement of instrumens, data analysis, conclusions and suggestions, and done.

4. Data Collection

The data collection technique is done by using interviews, observation, and questionnaires. This research was made in the form of a checklist using a multilevel scale, namely: (a) Weight 4 (very feasible); (b) Weight 3 (Eligible); (c) Weight 2 (Not feasible); (d) Weight 1 (not very feasible). Furthermore, the four dimensions will be described

according to the rating scale method. Add data collection here (Sugiyono, 2015). for more details can be seen in table 1. Research Assessment Criteria.

Table 1. Research Assessment Criteria

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

$$\text{Achievement} = \frac{\text{Scor Obtained}}{\text{Total Score}} \times 100\%$$

The analysis of the determination of eligibility is determined using the percentage achievement eligibility technique. The process of calculating the percentage is done by dividing the score obtained by the total score and multiplying by one hundred percent.

5. Results and Discussion

5.1 Numerical Results

The following table will explain the percentage of each vocational high school in Palembang City. for more details can be seen in table 2. Percentage of facilities and infrastructure for machining engineering workshops at SMK N 2 Palembang.

Table 2. Percentage of facilities and infrastructure for machining engineering workshops at SMK N 2 Palembang

No	Research Objects	Total Score	Percentage
1	Mechanical Workshop Building	45	80,35%
2	Mechanical Workshop Furniture	49	76,56%
3	Mechanical Workshop Equipment	26	81,25%
4	Mechanical Workshop Learning Media	15	75%
5	Other Mechanical Workshop devices	31	77,5%

From the table above, it can be seen that the research object of the machining workshop building with a total score of 45 with a percentage of 80.35%, very feasible category, machining workshop furniture with a total score of 49 with a percentage of 76.56% very feasible category, machining workshop equipment with a total score of 26 with a percentage of 81.25% in the very feasible category, the media for the machining workshop with a total score of 15 with a percentage of 75% in the feasible category and other equipment for the machining shop with a total score of 31 with a percentage for 77.5% for the very feasible category.

The following table will explain the percentage of each vocational high school in Palembang City. for more details can be seen in table 3. Percentage of facilities and infrastructure for machining engineering workshops at SMK N SUMSEL.

Table 3. Percentage of facilities and infrastructure for machining engineering workshops at SMK N Sumsel

No	Research Objects	Total Score	Percentage
1	Mechanical Workshop Building	49	87,5%
2	Mechanical Workshop Furniture	52	81,25%
3	Mechanical Workshop Equipment	29	90,26%
4	Mechanical Workshop Learning Media	17	85%
5	Other Mechanical Workshop devices	33	82,5%

From the table above, it can be seen that the research object of the machining workshop building with a total score of 49 with a percentage of 87.5%, very feasible category, machining workshop furniture with a total score of 52 with a percentage of 81.25% very feasible category, machining workshop equipment with a total score of 29 with a percentage of 90.26 with a very feasible category, the machining workshop media with a total score of 17 with a percentage of 85% in the very feasible category and other equipment for the machining workshop with a total score of 33 with a percentage of 82.5% for the very feasible category.

The following table will explain the percentage of each vocational high school in Palembang City. for more details can be seen in table 4. Percentage of facilities and infrastructure for machining engineering workshops at SMK PGRI 2 Palembang.

Table 4. Percentage of facilities and infrastructure for machining engineering workshops

No	Research Objects	Total Score	Percentage
1	Mechanical Workshop Building	39	69,64%
2	Mechanical Workshop Furniture	41	64,06%
3	Mechanical Workshop Equipment	24	75%
4	Mechanical Workshop Learning Media	13	65%
5	Other Mechanical Workshop devices	26	65%

From the table above, it can be seen that the research object of the machining workshop building with a total score of 39 with a percentage of 69.64% in the feasible category, machining workshop furniture with a total score of 41 with a percentage of 64.04% in the feasible category, machining workshop equipment with a total score of 24 with a percentage 75 categories are feasible, media for machining workshops with a total score of 13 with a percentage of 65% in the feasible category and other equipment for machining shops with a total score of 26 with a percentage for 65% for the feasible category.

The following table will explain the percentage of each vocational high school in Palembang City. for more details can be seen in table 5. Percentage of facilities and infrastructure for machining engineering workshops at SMK YP Gaja Madah Palembang.

Table 5. Percentage of facilities and infrastructure for machining engineering workshops at SMK YP Gaja Madah Palembang

No	Research Objects	Total Score	Percentage
1	Mechanical Workshop Building	41	75%
2	Mechanical Workshop Furniture	43	56,57%
3	Mechanical Workshop Equipment	20	80,55%
4	Mechanical Workshop Learning Media	15	70,83%
5	Other Mechanical Workshop devices	29	75%

From the table above, it can be seen for the research object of the machining workshop building with a total score of 41 with a percentage of 75% in the feasible category, machining workshop furniture with a total score of 43 with a percentage of 56.57% in the feasible category, machine shop equipment with a total score of 20 with a percentage of 80.55 very feasible categories, the machining workshop media with a total score of 15 with a percentage of 70.83% in the feasible category and other machinery workshop equipment with a total score of 29 with a percentage of 75% in the feasible category.

The following table will explain the percentage of each vocational high school in Palembang City. for more details can be seen in table 6. Percentage of all vocational engineering workshop facilities and infrastructure in Palembang City.

Table 6. Percentage of all vocational engineering workshop facilities and infrastructure in Palembang City

No	Objek Penelitian	Total Score	Attainment Percentage
1	SMK N 2 Palembang	166	78,13%
2	SMK N SUMSEL	180	85,37%
3	SMK PGRI 2 Palembang	143	67,74%
4	SMK YP Gaja Madah Palembang	148	70,07%

From the table data above, it can be seen for the percentage of the overall feasibility of the facilities and infrastructure for workshops for the vocational engineering expertise program in Palembang City. for SMK Negeri 2 Palembang the total score was 166 and the percentage of eligibility was 78.13%, SMK Negeri SUMSEL had a total score of 180 and a percentage of 85.37%, SMK PGRI 2 Palembang had a total score of 143 with a percentage of 67.74% and the last was SMK YP Gaja Madah Palembang a total score of 148 with a percentage of 70.07%. So it can be said that the feasibility of the facilities and infrastructure for the engineering workshop of the vocational high school (SMK) in Palembang is in the proper category.

5.2 Graphical Results

The following will explain a graphic image for the percentage of each vocational school in Palembang City. for more details can be seen in figure 2. Percentage of Eligibility for Workshop Facilities at SMK N 2 Palembang

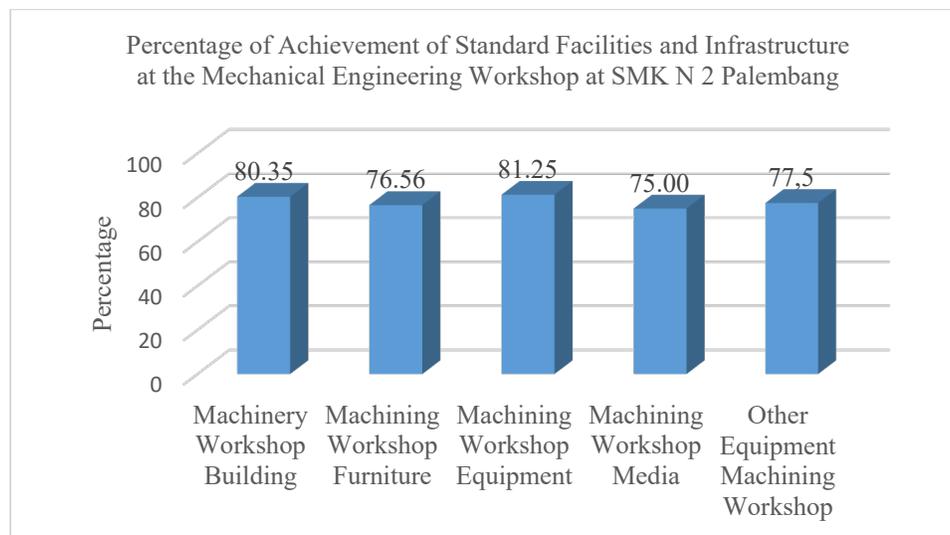


Figure 2. Percentage of Eligibility for Workshop Facilities at SMK N 2 Palembang

Based on data collection obtained from observations and interviews, the results obtained from the image data above can be seen for the percentage of the feasibility level of the Machining Workshop Building at 80.35%, 76.56% Machining Workshop Furniture, 81.25% Machining Workshop Equipment, Educational Media 75.00% Machining Workshop and 77.00% Other Equipment Machining Workshop. Meanwhile, the overall percentage of the achievement of facilities and infrastructure in the workshop for the Mechanical Engineering Skills Program at SMK Negeri 2 Palembang was 78.13%. So, it can be said that the feasibility level of the workshop facilities as a whole is very feasible. However, this cannot be said to be 100% because several factors influence it, including inadequate standard of school facilities and infrastructure, inadequate maintenance, less competent teaching staff, and limited financial resources.

The following will explain a graphic image for the percentage of each vocational school in Palembang City. for more details can be seen in figure 3. Percentage of Eligibility for Workshop Facilities at SMK N South Sumatera

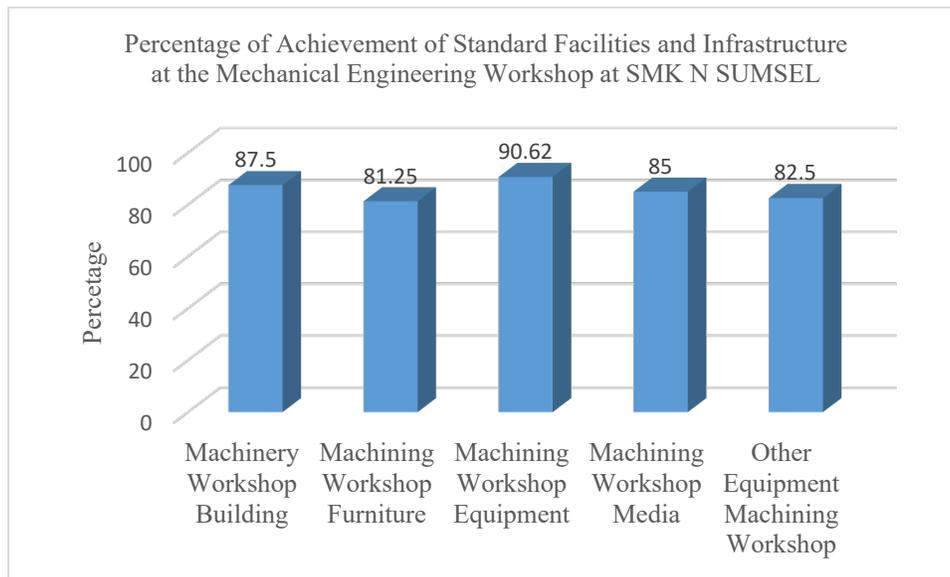


Figure 3. Percentage of Eligibility for Workshop Facilities at SMK N SUMSEL

Based on the data collected through observation, from the results obtained from the data in the picture above, it can be seen the percentage of the feasibility of workshop facilities and infrastructure for the engineering expertise program at SMK Negeri SUMSEL for the percentage of Machining Workshop Buildings of 87.5%, Machinery Workshop Furniture 81.25 %, Machining Workshop Equipment 90.26%, Machining Workshop Educational Media 85% and Other Machining Workshop Equipment 82.5%. As for the overall percentage of the achievement of facilities and infrastructure in the workshop for the Mechanical Engineering Skills Program at SMK Negeri SUMSEL Palembang, it was 84.52%. So, it can be said that the feasibility level of the workshop facilities is very feasible. Not 100% is said to be very feasible because several factors influence it, including inadequate standard of school facilities and infrastructure, inadequate maintenance, less competent teaching staff, and limited financial resources.

The following will explain a graphic image for the percentage of each vocational school in Palembang City. for more details can be seen in figure 4. Percentage of Eligibility for Workshop Facilities at SMK PGRI 2 Palembang

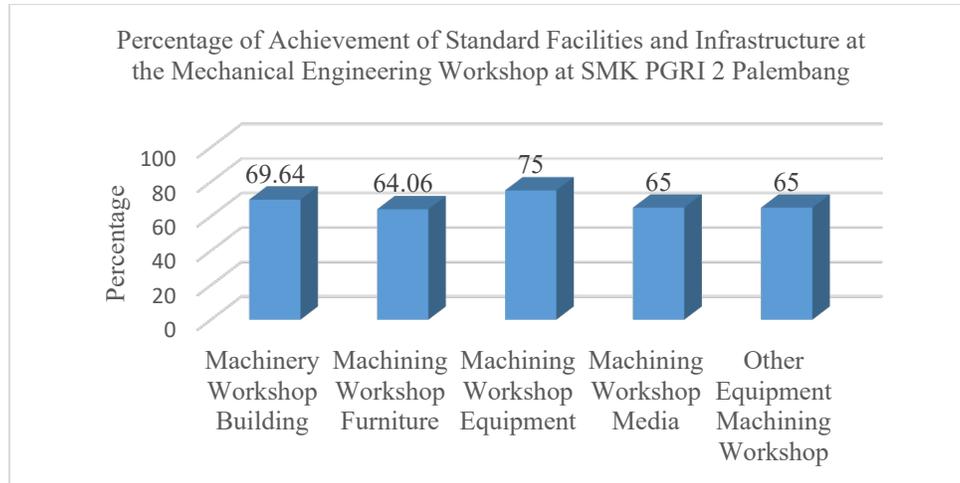


Figure 4. Percentage of Eligibility for Workshop Facilities at SMK PGRI 2 Palembang

Based on data collection and interviews, the results obtained from the data in the picture above can be explained that the feasibility level of the mechanical engineering department workshop facilities at SMK PGRI 2 Palembang, the percentage of the Machining Workshop Building is 69.64%, Machining Workshop Furniture 64.06%, Machinery Workshop Equipment 75%, Educational Media for Machining Workshop 65% and Other Equipment for Machining Workshop 65%. As for the overall percentage of the achievement of facilities and infrastructure in the workshop for the Mechanical Engineering Skills Program at SMK PGRI 2 Palembang, it was 67.74%. So it can be said that the feasibility level of the workshop facility is feasible. Not 100% is said to be very feasible because several factors influence it, including inadequate standard of school facilities and infrastructure, inadequate maintenance, less competent teaching staff, and limited financial resources.

The following will explain a graphic image for the percentage of each vocational school in Palembang City. for more details can be seen in figure 5. Percentage of Eligibility for Workshop Facilities at SMK YP Gaja Madah Palembang

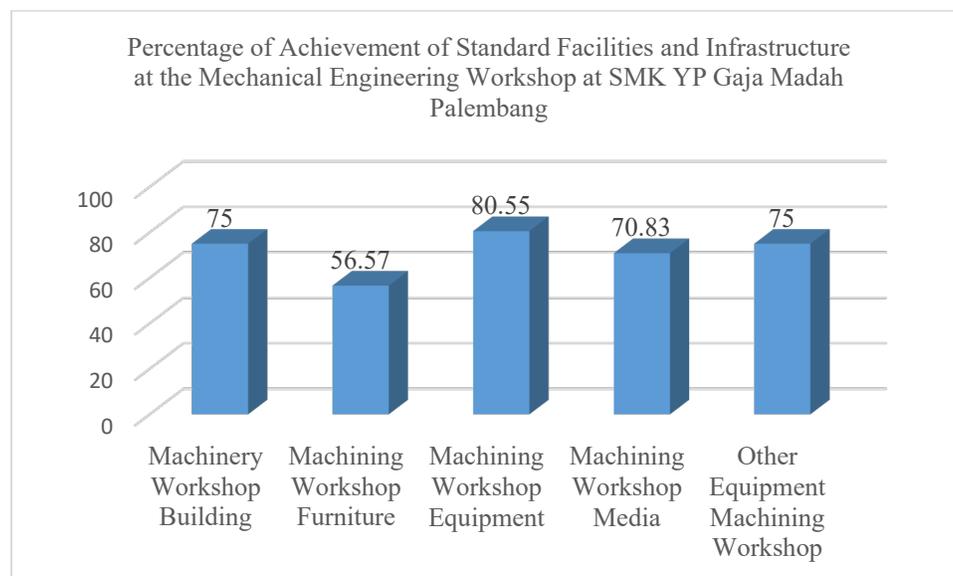


Figure 5. Percentage of Eligibility for Workshop Facilities at YP Gaja Madah Palembang

Based on the data collected through observation, the results obtained from the image data on the bag can be seen the percentage of the feasibility of machining engineering expertise program workshop facilities at SMK YP Gaja Madah Palembang for the percentage of Machining Workshop Buildings by 75%, 56.57% Machining Workshop Furniture, Equipment 80.55% Machining Workshop, 70.83% Educational Media for Machining Workshop and 75% Other Equipment Machining Workshop. As for the overall percentage of the achievement of facilities and infrastructure in the workshop for the Mechanical Engineering Skills Program at SMK YP Gaja Madah Palembang, it was 70.07%. So, it can be said that the feasibility level of the workshop facility is feasible. Not 100% is said to be very feasible because several factors influence it, including inadequate standard of school facilities and infrastructure, inadequate maintenance, less competent teaching staff, and limited financial resources.

The following will explain the average percentage of the overall feasibility of the workshop facilities and infrastructure for the mechanical engineering expertise program at the vocational high school in Palembang city which can be seen in Figure 6. Percentage of Overall Eligibility of Vocational School Workshop Facilities in Palembang

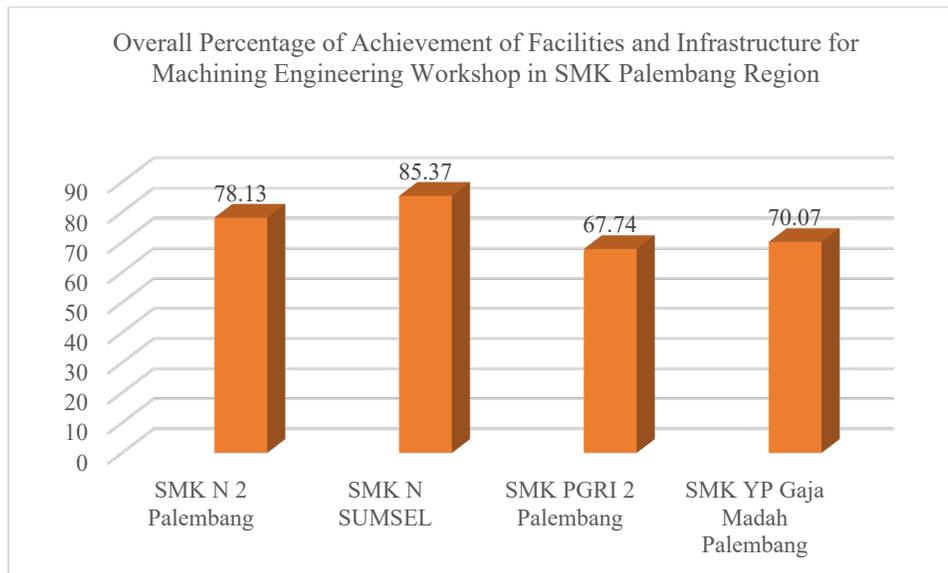


Figure 6. Percentage of Overall Eligibility of Vocational School Workshop Facilities in Palembang

From the data in the image above, it can be seen for the percentage of the feasibility of facilities and infrastructure for workshops for the vocational engineering expertise program in Palembang City. for SMK Negeri 2 Palembang the eligibility percentage was 78.13% obtained from the data on figure 2. Percentage of Eligibility for Workshop Facilities at SMK N 2 Palembang, SMK Negeri SUMSEL was 85.37% obtained from the data on figure 3. Percentage of Eligibility for Workshop Facilities at SMK N SUMSEL, SMK YP Gaja Madah was 67.74% obtained from the data on figure 4. Percentage of Eligibility for Workshop Facilities at SMK PGRI 2 Palembang and the last was SMK PGRI 2 Palembang by 70.07% obtained from the data on figure 5. Percentage of Eligibility for Workshop Facilities at YP Gaja Madah Palembang So it can be said that the vocational high school (SMK) workshop facilities in Palembang can be categorized as feasible.

6. Conclusion

Based on the description of the data above, it can be concluded that the Feasibility Level in terms of the Machining Workshop Infrastructure of the SMK Machining Engineering Expertise Program in Palembang, for SMK N 2 Palembang, namely in terms of the Machining Workshop building, the Machining Engineering Expertise Program is 80,35% (very feasible), the feasibility level is reviewed of the furniture in the Machining Workshop Machining Engineering Expertise Program is 76,56% (very feasible). The feasibility level in terms of equipment in the Machining Workshop Machining Engineering Expertise Program is 81,25% (very feasible). The feasibility level in terms of

educational media at the Machining Workshop for the Machining Engineering Expertise is 75% (feasible). The feasibility level in terms of other devices in the Machining Workshop Machining Engineering Expertise Program is 77,5% (very feasible). Achievement Level Overall Feasibility of Machining Workshop Facilities and Infrastructure Machining Engineering Expertise Program is 78,13% (very feasible).

For SMK N SUMSEL, namely in terms of the Machining Workshop building, the Mechanical Engineering Expertise Program is 87,5% (very feasible). the feasibility level in terms of the furniture in the Machining Workshop Machining Engineering Expertise Program is 81,25% (very feasible). The feasibility level in terms of equipment at the Machining Workshop Machining Engineering Expertise Program is 90.62% (very feasible). The feasibility level in terms of the Educational Media at the Machining Workshop for the Machining Engineering Expertise is 85% (very feasible). The feasibility level in terms of other equipment in the Machining Workshop Machining Engineering Expertise Program is 82,5% (very feasible). Achievement Level Overall Feasibility of Machining Workshop Facilities and Infrastructure Machining Engineering Expertise Program is 85,37% (very feasible).

For SMK PGRI 2 Palembang, which is in terms of the Machining Workshop building, the Mechanical Engineering Expertise Program is 69,64% (feasible), the feasibility level in terms of the furniture at the Machining Workshop Machining Engineering Expertise Program is 64,06% (feasible). The feasibility level in terms of equipment at the Machining Workshop Machining Engineering Expertise Program is 75% (feasible). The feasibility level in terms of the Educational Media at the Machining Workshop for the Machining Engineering Expertise is 65% (feasible). The feasibility level in terms of other equipment in the Machining Workshop Machining Engineering Expertise Program is 65% (feasible). Achievement Level Overall Feasibility of Machining Workshop Facilities and Infrastructure Machining Engineering Expertise Program is 67,74% (feasible).

For SMK YP Gaja Madah Palembang, which is in terms of the Machining Workshop building, the Mechanical Engineering Study Program is 75% (feasible). the feasibility level in terms of the furniture in the Machining Workshop Machining Engineering Expertise Program is 56.57% (feasible). The feasibility level in terms of equipment at the Machining Workshop Machining Engineering Expertise Program is 80,55% (very feasible). The feasibility level in terms of the Educational Media at the Machining Workshop for the Machining Engineering Expertise is 70,83% (feasible). The feasibility level in terms of other equipment in the Machining Workshop Machining Engineering Expertise Program is 75% (feasible). Achievement Level Overall Feasibility of Machining Workshop Facilities and Infrastructure Machining Engineering Expertise Program is 70,07% (feasible).

So it can be concluded that the facilities and infrastructure of the SMK machining workshop in Palembang city as a whole in terms of the machining workshop building, machining workshop furniture, machining workshop equipment, machining workshop educational media, and other machinery workshop equipment can be categorized as feasible.

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