The Readiness of Automotive Workshop And Laboratory in Vocational Education High School in Facing 4.0 Industrial Era

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Abstract. This Research is aimed at describing the readiness of Automotive Workshop and Laboratory on SMK N 2 Luwuk in facing 4.0 Industrial Era. This research employed discrepancy model. The data in this research was obtained from interview, observation and descriptively analyzed. The readiness of automotive workshop and laboratory in facing 4.0 industrial era is measured from the standard in designing proper and convenience workshop and laboratory in vocational high school by Direktorat Pembinaan SMK. The aspects are teh work area, human resource ande the resource of facilities and infrastructure fulfilment.

Keywords: workshop, laboratory, industry 4.0, vocational high school.

1. Introduction
The world is continuously evolved and now it is arriving in 4.0 industrial era which causes changes in the requirement of employees. Triyono [1] (2017: 1) said that the changes in the requirement of employees, now and later, was clearly observed as the effect of 4.0 industrial revolution. Industry 4.0 is a technological revolution phase which changes the means people do activities in scale, scope, complexity, and transformation from prior life experiences [2] (Yahya, 2018: 9). The nation, in this case the policy holder of Vocational Education in Indonesia must be ready to face 4.0 industrial era by promptly respond and structured developing a map in facing 4.0 industrial era. The 4.0 industrial challenge should be respond by not only the country, but also every single elements of the policy holder of Vocational Education who are collaborated with local government, experts and the whole society reciprocally collaborated with industry in facing the challenge of 4.0 industrial era.

Vocational school is continuously developed and improved in facing 4.0 industrial era. 4.0 industrial era prompts the holder of vocational education in Indonesia to carefully create innovation which can make vocational education has an excellent quality by which creates students whom has good morals and qualified skills that match with requirement in 4.0 industrial world. Government has developed a program which is called vocational education that comes from Presidential Instruction Number 9 of
2016 about the revitalization of vocational high school Kemenperin [3] (2018) has conducted five stages in industrial vocational education program in 10 provinces which was followed by 569 companies and 1537 vocational high school. The high demand from industrial side shows that company needs professional employees whom have specific skill.

SMK is formerly generated learners who works in certain major as stated in Article 15 of the 2003 National Education System Law that vocational education is secondary education which prepares learners to directly work in certain major. BPS noted that in August 2018 the level of open unemployment in local region is 5.34 percent. The highest level of unemployment, which seen from the level of education, comes from the alumnae of vocational high school at 11.24 percent. The alumnae of vocational high school in Banggai, Central Celebest according to the report of Disnakertrans until october 2018, the level of unemployment is 1.440 alumnae whom not yet sign a contract in company. The high level of unemployed alumnae of vocational high school represents the weakness of the school to prepare learners who have certain skill that are needed by the industry in Banggai and Central Celebest.

Workshop and laboratory for vocational education is the first place where the students acquiring understanding and vocational skills. Workshop and laboratory are also have enormous benefit and role in giving hard skill that fit with the industries. Manik [4] (2011) in Ismara and Prianto stated that a laboratory and workshop are one infrastructure component in conducting effective teaching-learning activity which has dominant urgency in the efforts to improve the quality of learning and education which have purpose to improve the quality of alumnae optimally. SMK in the Regulation of the Minister of National Education of the Republic of Indonesia Number 40 of 2008 has to have proper workshop or work area. A proper workshop and laboratory can lead to the improvement of certain skills that needed by the industries. The convenience of the workshop influences the skills’ improvement of the learners in facing 4.0 industrial era. A proper and convenience workshop and laboratory for the learners as stated by Ismara dan Priyanto [5] (2017: 207) can be seen from some aspects such as: workshop’s atmosphere, the maintenance of the workshop, practice tools, workshop equipment, the application of K3 for learners and the application of 5S (seiri, seiton, seiso, seiketsu dan shitsuke).

SMK Negeri 2 Luwuk is one of vocational high school in Banggai which has automotive major that divided into two competences which are Light Vehicle and Motorcycle Business Technique. Motorcycle Business Technique is one major that collaborated with PT AHM Honda. In seeing the readiness of automotive workshop and laboratory in facing 4.0 industrial era has focus on some aspects of the practice, human resources and sources of fulfillment of facilities and infrastructure.

1.1 Work Area
Ismara dan Priyanto [6] (2017: 207) said that in the workplace/work area all the equipment must be well-organized. The equipment in the workshop and laboratory are well-maintained, clean and ready to use. The equipment has planned maintenance and organized-register. The equipment and tools in the workshop and laboratory are always inspected, set, lubricated, and cleaned. The work area in the workshop is always in a convenience condition, clean, tidy also all the equipment and tools are reachable from work area.

1.2 Human Resource
The management and preparation of workshop and laboratory in facing 4.0 industrial era need experienced, creative, and solid in a team work human resources. The human resources in the automotive workshop and laboratory are teacher and technician/laboratory staff. The human resources in the workshop and laboratory that the teacher is helped by the laboratory staff according to Directorate of Education Personnel Development [7] (2017: 16) who has the role to guide the process
of teaching-learning activity start from planning, organizing, preparing, treating and maintaining the material, equipment, tools, spare parts and K3 in the vocational high school’s workshop or laboratory.

1.3 The Resource of Facilities and Infrastructure Fulfilment

The teaching-learning activity in the school in order to fulfil the facilities and infrastructure is all the activities in providing all the things that needed to support the teaching-learning process. The standard of the facilities and infrastructure in the education has been stated in on the Government Regulation No. 32 of 2013 with the criteria of classroom, sport area, prayer room, library, laboratory, workshop, play room, recreation area, and another learning sources that are essential to support the teaching-learning process, include the use of information and communication technology. The fulfilment of facilities and infrastructure are divided to some scheme such as industrial needs, curriculum, teaching factory, tutorial media and LSP or Institution of professional certification [8] (Directorate of Vocational Development, 2017: 147). The scheme is organized with a purpose to fulfil the facilities and infrastructure as the standard that has been set by LSP. Directorate of Vocational Development said [9] (2017: 148) that the source of facilities and infrastructure fulfilment in the school for workshop or laboratory, there are some scheme in the fulfilment such as grant, purchase, self-made, recycle and refinement.

2. Method

This research is an evaluative research that employed discrepancy model. Discrepancy evaluation model is a program gap evaluation which focuses in the discrepancy or gap that occurs in the implementation of a program [10] (Arikunto&Jabar, 2014: 48). The discrepancy in this research is the gap/discrepancy which become the standard of a program that is set by the government in the vocational high school. This research used a parameter from the standard in developing proper and convenience automotive workshop and laboratory in vocational high school from Directorate of Vocational Development. This research was conducted on June 2018 at SMK N 2 Luwuk. The data was obtained from direct observation at SMK N 2 Luwuk and conducted unstructured interview with the teacher and the administrator of the automotive workshop and laboratory. The variable in this research covers some points or aspects which are work area/practice area, human resources and the resource of facilities and infrastructure fulfilment.

3. Result

3.1 Work Area of Light Vehicle Technique

According to Table 1, work area of Light Vehicle Technique based on the interview and observation which all of the indicators, arrangements, maintenance and cleaning of the equipment, tools and work area is adequate

| Work Area of Light Vehicle Technique | Category |
|-------------------------------------|----------|
| Arrangement                         | Adequate |
| Maintenance                         | Adequate |
| Cleaning                            | Adequate |

Tools and equipment were not well-organized which make the teaching-learning activity was not conducive. Technician/laboratory staff had certain role, the role of the technician/laboratory staff were checking, maintenance and cleaning the tools and equipment in the workshop and laboratory. Workshop and laboratory in Light Vehicle Technique major did not have technician which made the productive teacher did the role. The problems that come up from the work area which has deficiency will affect the learners. This condition makes the teaching-learning activity is not effective and learners cannot do their work/practice to enhance their vocational skills which also lead to the...
unprepared when the learners want to work in the industrial world. The deficiency of the work area / practice area where all the learning process is held indicate that there is lack of readiness in facing 4.0 industrial era.

3.2 Work Area of Motorcycle Business Technique
According to Table 2, work area of the Motorcycle Business Technique skill, based on the interview and observation about the arrangement of equipment, tools and work area is fair. The maintenance in the workshop and laboratory is adequate. The cleaning indicator of the equipment, tools, and work area is good.

| Work Area of Motorcycle Business Technique | Indicator | Category |
|--------------------------------------------|-----------|----------|
| Arrangement                                | Fair      |
| Maintenance                                | Adequate  |
| Cleaning                                   | Good      |

The equipment, tools and learning aids were well-organized. The equipment and tools in the automotive workshop and laboratory have a toolbox to store it post the practice. The maintenance indicator of the equipment and tools were adequate. The tool man/laboratory staff that resisted doing the job made the productive teacher had double job which made the productive teacher had bias focuses and made the teaching-learning activity less effective. The maintenance which not works effectively will disturb the teaching-learning process because of the broken equipment as the result of non-scheduled maintenance. Cleaning in the workshop and laboratory of Motorcycle Business Technique major was conducted by both of productive teacher and learners. The cleaning process in the workshop and laboratory is categorized as good because there was no tool man/laboratory staff made the teaching-learning activity that both of the productive teacher and learners should be focus on their practice/work. The problems that come up in work area which has deficiency will influence the learners and make the teaching-learning activity will not effectively conducted and learners cannot improve the skills that needed by the industry. The deficiency in the maintenance and cleaning process of the teaching aids in the workshop and laboratory indicate that there is a lack of readiness in facing 4.0 industrial era.

3.3 Human Resources
Workshop and laboratory run well if the administrator can cooperate, the sufficient human resource and competent workshop administrator in the vocational high school. SMK N2 Luwuk is one of vocational high school which has 2 skill competences which are Light Vehicle Technique and Motorcycle Business Technique that each of which needs competent human resource to organize it so that the workshop becomes beneficial to the teaching-learning process. Teacher can improve the learners’ skills. The result of the interview and observation showed that the condition in the workshop and is not yet ready in facing 4.0 industrial era properly. Human resource in this case is the one who assists the productive teacher to manage the workshop and laboratory that is called as technician / laboratory staff which can also the teacher that has multiple roles as a technician. However, this condition is often complained by the teacher because it makes the teaching-learning activity not effective and the maintenance of the workshop does not optimally run. Besides conducting teaching-learning activity, the teacher also conducting the role of the technician/laboratory staff such as planning, organizing, preparing, treating and maintaining the material, equipment, tools, spare parts.
and K3 in the vocational high school’s workshop or laboratory. The lack of human resource in the workshop management indicates the lack of readiness in facing 4.0 industrial era.

3.4 The resource of Facilities and Infrastructure Fulfilment

The determination of the facilities and infrastructure demands are based on industrial needs, curriculum, teaching factory, video tutorial, and LSP which create a connection in the formation of facilities and infrastructure fulfilment in vocational high school. The facilities and infrastructure in vocational high school should be adjusted from the standard of facilities and infrastructure which has been set by LSP. The facilities and infrastructure fulfilment in order to support the practice based learning can be done with various schemes. The facilities and infrastructure fulfillment on SMK Negeri 2 Luwuk based on the interview and observation in order to fulfil the teaching-learning aids for the sake of learners’ practice which has purpose to improve the skills that needed by industry were not yet works maximally. SMK N2 Luwuk is one of vocational high school which has 2 skill competence majors which are Light Vehicle Technique and Motorcycle Business Technique. The needs’ fulfilment to support the practice based learning in Light Vehicle Technique major which comes from grant scheme from either the committee, industry or government, the grantscheme is considered low. The fulfilment of urgent needs to support the practice based learning from the result of the interview with the productive teacher that also has a role as the workshop’s head sometimes stagnates and of with no doubt can affect on the learners’ practice based learning. The fulfilment of the secondary needs to support the Motorcycle Business Technique major from grant scheme either from the committee, industry or government is considered good. The needs’ fulfilment on Motorcycle Business Technique major is assisted by the collaboration with PT. AHM Honda. However, the equipment to support practice based learning with that collaboration is not yet sufficient to support the practice based learning which has purpose to improve the learners’ skill. The fulfilment of the workshop and laboratory equipment form both majors by means of other schemes such as self-made equipment, recycle and also refinement is considered fair. The fulfilment of the practice equipment by means of self-made scheme, learners and teacher were made simple practice equipment is considered good in order to support the teaching-learning process. The fulfilment of the practice equipment by means of recycle which is done by using the teaching aids which were available in the workshop and laboratory which still can be utilized is considered good. The fulfilment of the practice equipment by means of refinement scheme, in this case was done by either the teacher or the external technician to help the refinement of the practice equipment, is considered good. The three schemes were considered low to support the preparation of the workshop and the laboratory in facing 4.0 industrial era. The lack of human resources make the workshop and laboratory management is not yet effective and efficient.

4. Conclusion

Based on the result of the analysis from the readiness of automotive workshop and laboratory on SMK N 2 Luwuk can be concluded that in the work area/practice area aspect which was divided into two competences, Light Vehicle Technique major that showed adequate category and Motorcycle Business Technique major that showed good category. In the human resource aspects on the Light Vehicle Technique and Motorcycle Business Technique major showed adequate category. In the source of facilities and infrastructure fulfilment aspect on the Light Vehicle Technique major on the grant scheme and purchase showed adequate category. Meanwhile, on the Motorcycle Business Technique major on the grant scheme and purchase showed good category. The fulfilment of the workshop and laboratory equipment from both of the major by other schemes such as self-made, recycle and refinement still categorized as fair. The three of the scheme considered as less beneficial to help preparing the workshop and laboratory in facing 4.0 industrial era.
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