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Management of industrial class in vocational education

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Abstract— This study aims to describe the management of industrial classes in SMK Muhammadiyah 2 Ajibarang. This research uses a qualitative type with a case study approach. Research subjects were the deputy head of public relations, the deputy head of the curriculum, the head of the engineering engineering program, the head of the light vehicle engineering program and the head of the motorcycle engineering expertise program. Place of research at SMK Muhammadiyah 2 Ajibarang. Data collection techniques using interviews, observation, and documentation. The collected data were analyzed with the model of Miles, Hubermen, and Saldana. Research data 1) Industrial class planning includes aspects of students carried out by industry and schools as the organizer. The human resource aspect is carried out by means of instructor training organized by industry to increase knowledge about the industry. The curriculum aspect is carried out by synchronizing the school curriculum with the industrial curriculum, then the aspect of infrastructure facilities is carried out by industry and schools with industrial involvement in the form of setting industry class standards and procuring infrastructure and forms of school involvement in the form of procurement. 2) The implementation of industrial classes includes learning that is adjusted to the established curriculum and the internship carried out in the industry. 3) evaluation which includes evaluating student learning outcomes, in the form of students getting certificates from the industry and evaluating the implementation of industrial classes in the form of internal meetings and visits made by schools to industry and industry to schools.

Keywords: *Management, Industry class, Work-based learning, Vocational education*

I. INTRODUCTION

Vocational High School (SMK) is a formal level of education that provides specific skills in preparing graduates to be ready to work. Based on Government Regulation No. 29 of 1990 concerning secondary education, the purpose of secondary education article 3 is that vocational secondary education prioritises the preparation of students to enter the workforce and develop professional attitudes. Law No 20 of 2003 concerning the National Education System Article 15 also explains that the purpose of Vocational High Schools (SMK) is secondary education that prepares students primarily to work in certain fields.

Based on news published by kompas.com, the unemployment rate in Indonesia in 2017 increased by 10,000 people to 7.04 million people in August 2017 from August 2016 of 7.03 million people. From the education level in August 2017, the unemployment rate for vocational high schools (SMK) was the highest among other education levels, at 11.41 per cent. The next highest unemployment rate was for senior high schools (SMA) at 8.29 per cent.

Schools that aim to prepare students for the world of work mean that SMK ideally has a programme that is relevant to the world of business and industry (DU / DI). Schools in adapting to DU / DI are very difficult, one of which is due to the increasing gap between industries, one of the efforts made by schools and industry is to form industrial classes. The establishment of this industrial class is expected to produce students who have competencies that are in line with the standards required by the industries that collaborate with schools.

Industrial class is a cooperation programme between industry and vocational education units in integrating school learning with the industrial world (Slamet et al., 2017). Industrial class is also one of the patterns of educational implementation carried out in vocational high schools (SMK), which combines the school education system with the industrial system in the relevant school and industry.The gap is in the form of technological gap, school curriculum is not in accordance with the needs of industry, and educators have not kept up with what is happening in the industrial world. This results in a lack of readiness among vocational school graduates.

The gap that exists between educational institutions and the world of industry calls for cooperation that can reduce this gap, so that school education can keep up with the times and produce graduates who are in tune with the needs of the market. Through this industrial cooperation, the educational process in schools will be adapted to the needs of industry. It is hoped that the absorption of graduates in the world and directed to achieve the mastery of student competencies in accordance with the development of science and technology. SMK Muhammadiyah 2 Ajibarang is one of the schools that organise industrial classes, including Daihatsu class in cooperation with PT Astra Daihatsu Motor starting in 2010, AHM class in cooperation with PT Astra Honda Motor starting in 2012 and Hitachi Power Systems class in cooperation with PT Hitachi Power System starting in 2018.

The problems described above call for the formation of industrial classes. The purpose of establishing industrial classes is to minimise the gap that exists between education in schools and the needs of workers in DUDI. The industrial classes are expected to produce graduates who have competences according to the standards required by DUDI. The reason why the formation of industrial classes is necessary is because later graduates of SMK Muhammadiyah 2 Ajibarang, when they are absorbed into the industrial world, can be competent in their fields, reduce the number of dropouts because they do not master the new technologies used in the company and are not surprised when they enter DUDI. Although students have been equipped by participating in Industrial Work Practices, their experience is still lacking and requires more intensive time. The purpose of this study was to determine:

(1) Planning of industrial classes, which includes aspects of students, human resources, curriculum and infrastructure.
(2) Implementation includes the implementation of industrial class learning and the implementation of work placements.

(3) Evaluation includes evaluation of learner activities and evaluation of industrial class implementation.

II. METHODS

This research used qualitative research because this research describes and describes the management of industrial classes at SMK Muhammadiyah 2 Ajibarang. The management of this industrial class includes planning, implementation and evaluation. This research was conducted in SMK Muhammadiyah 2 Ajibarang. The subjects of this study were the deputy head of public relations, deputy head of curriculum, chairman of machining technology specialisation programme, chairman of light vehicle technology specialisation programme and chairman of motorcycle technology specialisation programme.

2.1 Data, instruments and data collection techniques

The techniques used to collect data in this study were interviews, observation and documentation. In this study, interviews were conducted to gather information about industrial classes in SMK Muhammadiyah 2 Ajibarang. This interview was conducted with the deputy head of public relations, deputy head of curriculum, 1 person from each expertise programme in industrial class. In this study, observations were made by observing the industrial classroom environment in SMK Muhammadiyah 2 Ajibarang. This observation aims to obtain information about the condition of the working environment and the availability of facilities and infrastructure to support industrial classes. In this study, document data in the form of archives related to industrial classes.

The technique in data analysis in this study used Miles (2014) analysis technique that there are three streams of activities or activities in qualitative data analysis. The activities in data analysis are: Data Condensation, Data Display, and Conclusion Drawing/Verification, namely, referring to the data by selecting, simplifying, abstracting, and/or transforming the data that approaches the entire section of written field notes, interview transcripts, documents, and other empirical materials. Then, all the information is brought together for deeper analysis in order to take action and draw conclusions. The final step is to draw conclusions and test them.

The researchers condensed the data by selecting parts of the industrial class that would be discussed. Presenting the data in the form of a grouping of industrial class activities related to the planning, implementation and evaluation of industrial classes, including aspects of students, human resources, curriculum and infrastructure, and concluding on the basis of theoretical studies.

III. RESULTS AND DISCUSSION

The results of the research on industrial class management at SMK Muhammadiyah 2 Ajibarang include (1) industrial class planning which includes aspects of students, human resources, curriculum and infrastructure. (2) Implementation includes implementation of industrial class learning and implementation of internship. (3) Evaluation includes evaluation of learners' activities and evaluation of industrial class implementation.

3.1 Planning

3.1.1 Planning on the learner aspect

According to Terry (1996) planning is the selection and combination of facts, making and using assumptions about the future by describing and formulating certain activities that are believed to be necessary to achieve a certain result. Learner aspect planning is the formulation

of activities that will be carried out by individuals who study both formal and informal knowledge. The earliest function of the whole management function, in terms of learners as a whole, the three industrial classes at SMK Muhammadiyah 2 Ajibarang are fully planned by the cooperating industry and supported by the school as the organiser. Learner planning includes the activities of (1) learner needs analysis, (2) learner recruitment, (3) learner selection, (4) orientation, (5) learner placement, and (6) recording and reporting (Amirin, 1986).

In terms of learner needs analysis on the number of students and the number of industrial classes is fully planned by the industry, this applies to the three industrial classes in SMK Muhammadiyah 2 Ajibarang. In the Daihatsu class, it is conducted in Class X with 30 students and the number of classes available is one class. In addition, Honda and Hitachi in 2018/2019 will be conducted in Class X with 36 students and the number of available classes is eleven classes.

The selection methods that can be used are: (1) through tests or examinations, (2) through searching for talent skills, (3) based on STTB scores or UAN scores (Zulhardi, 2019). Placement of students or selection of students in industrial classes is done through tests. Selection of students is done by industry and school through tests. In the Daihatsu class, the test material comes entirely from the industry itself, the school's involvement in this selection is in the form of a test organiser. In addition to organising the test, the school is also involved in collating the students' test results and the students' heights, the results of which are then submitted to the industry. The industry has full control over which students are accepted into the Daihatsu class.

The same thing happens with Honda and HItachi, in the implementation of the test, the question material comes from the industry, what distinguishes it from the Daihatsu class is that the school is involved in creating the questions that will be tested on the students, combining question material from the industry with material from the school. This is done because the school feels that the question material provided by industry does not cover soft skills material. The school also plays a role in interview selection for students who meet the score requirements at the time of the test. In the Versa class, no selection of students has ever taken place. The discussion about planning from the students' point of view is good. As the selection of students is done by means of a test, this serves to see the readiness of students to enter the industrial class.

3.1.2 Human resources planning

Human resource planning is a set of activities that adapt to future interests and environmental demands and provide appropriate resources for these conditions (Kompri, 2015). In this human resource planning, existing resources are expected to be directed such as training and human resource development activities. Human resource planning is the steps taken at this time to ensure the availability of the right human resources for the organisation in the future (Zulhardi, 2019).

Human Resource Planning is the process of determining workforce needs and the means of meeting those needs so that their implementation interacts with organisational plans (Sikula, 1976). Human resource planning is the process of analysing and identifying the availability and requirements of human resources so that the organisation can achieve its objectives (Malthis & Jackson, 2006; Noor et al., 2023).

Human Resource Planning is a systematic plan to forecast the future demand and supply of employees, both in terms of numbers and types, so that the HR department can properly plan the implementation of recruitment, selection, training and other activities (Noe et al., 2019).

Workforce planning is a process that systematically assesses the state of human resources to ensure that the right number and quality of people with the right skills are available when they are needed.

One of the functions of human resource management in education is training and development programmes. The aim of training programmes is to improve the mastery of various skills and techniques for the performance of specific work for current needs (Kompri, 2015). The same is included in Permendiknas No. 16 of 2007, which states that the characteristics of an educator include academic qualification standards and educator competencies. Academic qualifications can be obtained through formal education as well as feasibility and equivalence tests, which are usually demonstrated by certificates or diplomas. In industry training, teaching is an important stage in the implementation of the learning process. In industrial classes, instructors are required to be able to provide specific material related to the product that is associated with the industrial class. As in the Daihatsu class, instructors are required to be able to provide material related to Daihatsu, such as measuring instruments, instructors must be able to explain the measuring instruments used in the Daihatsu industry.

Human resources planning, especially in the area of training or instructor training, has been well implemented so far, as training is continuously carried out to improve instructor skills in line with the times, especially technological developments in the industry.

3.1.3 Planning the Curriculum

In the Daihatsu class, curriculum planning is done by synchronising the 2013 curriculum, SMK Muhammadiyah 2 Ajibarang and the Daihatsu curriculum, which is called the basic curriculum. Not much different from the curriculum planning at Honda and Hitachi, in this case the industry communicates with the school about the curriculum used by the school, and then the industry adapts the school curriculum to the needs of the industry. The curriculum at Honda and Hitachi is called the Honda and Hitachi curriculum. In the same way, the curriculum used by the industry and the schools is planned.

A good curriculum will be successfully formed in such a way when the discussion process and curriculum design are truly in accordance with the needs in the field (Yamin, 2012). The curriculum planning for industrial classes is done by synchronising the national curriculum and the industrial curriculum, which shows that the curriculum for industrial classes is formed based on the needs of the students, especially in vocational schools that are oriented towards outputs that are ready to enter the world of work.

Curriculum planning must be realistic, i.e. based on the real needs of the participants and the needs of the community. Curriculum planning in industrial classes involves schools as implementers of education and industry as users of education (Kompri, 2015). This is in line with what has been revealed Yamin (2012) that the curriculum should be prepared jointly by instructors and a number of other elements that prioritise common interests for educational purposes at the local level and based on national educational goals. In the preparation of the curriculum for the industrial classes, schools and industries were also involved in the preparation of the curriculum in order to adapt it to the needs of the students in the future.

Based on the description above, the curriculum planning in industrial classes at SMK Muhammadiyah 2 Ajibarang is good because it includes the needs of the students in the field, is realistic and has involved elements with interest in educational development in its preparation.

3.1.4 Planning of facilities and infrastructure

Procurement is the provision of tools or media to support learning. The procurement process involves steps in planning facilities and infrastructure (Amirin, 1986). The process of planning facilities and infrastructure is carried out by the industry by setting standards for opening industrial classes. In the Daihatsu class, there are class standards and facilities according to what Daihatsu and Daihatsu dealers use. Similarly, the Honda and HItachi classes have set their own standards, ranging from room standards to room equipment.

Procurement in the three classes went well because it was in line with the agreed plan, as evidenced by the facilities in each industry class in line with existing plans. Procurement is carried out by industry in the form of facilities and infrastructure support, and procurement by schools is carried out through a school procurement mechanism. Procurement in the Daihatsu class is carried out by means of a shared budget, i.e. the division of procurement carried out by industry and schools. Similarly, Honda and HItachi are procured by industry and schools.

3.2 Implementation

3.2.1 Learning implementation

The implementation of learning in industrial classes is in accordance with the established curriculum planning. The methods used in the implementation of learning are worksheets / assignments, classroom learning and practice. For SMK practice has more teaching hours than the delivery of material in the classroom, this aims to prepare SMK graduates who are independent to enter the world of work and meet the industry's labour needs.

Of all these possibilities, improving the quality of learning occupies a very strategic position. Quality learning is expected to improve student learning outcomes (Sudira, 2006). An activity is also referred to as learning when it contains elements of giver and receiver to help the receiver to get the core provided by the giver (Zainal Arifin, 2019). Learning activities in the classroom are carried out by teachers in order to convey the subject matter to students.

Learning in SMK must take into account the requirements of the world of work (demand-driven), be developed and implemented in relation to the achievement of standardised competences, recognising the abilities that students already have through the mechanisms of Recognition of Prior Learning (RPL) and Recognition of Current Competency (RCC), implemented in an integrated manner between school learning programmes and training in the world of work (classroom, school and industrial practice) (Sudira, 2006).

Learning in industrial classes is good because learning emphasises more on practical learning methods and output in industrial classes has been prepared to enter the industrial world, especially in industries that cooperate with these industrial classes. In terms of output preparation, students have been provided with industry-related materials, such as the Daihatsu class, which has been provided with industry-related learning materials, and Honda and HItachi, which have been provided with industry-related learning materials. This is an added value for graduates of industrial classes to have employment opportunities in industries that cooperate with these industrial classes.

3.2.2 Implementation of industrial working practices

The implementation of industry plays an important role in industrial work practice. The

industry acts as a place for students to carry out work placements and schools act as intermediaries in communicating matters related to student work placements, such as student work placement places, the implementation of student work placement selection and students who are accepted to work placements. The school and the industry always communicate intensively about the progress of the students during the internship through the internship supervisors' direct monitoring to the industry. In the Daihatsu and Honda and HItachi classes, the industry plays a role in the placement of students, the evaluation of students' work experience results in the form of the provision of evaluation forms and the provision of student work experience certificates.

Preparing the workforce to meet the needs of the economy and industry is the focus of vocational education (Arfandi & Makasar, 2009). For this reason, the government is implementing a link and match in the organisation of vocational education. The change from school-based education to dual-based education in accordance with the link and match policy expects vocational education programmes to be implemented in two places. One part of the educational programme is carried out at school, namely basic vocational theory and practice. The other part is carried out in the world of work, namely productive skills acquired through the principle of learning by doing.

The basic vocational training component is carried out in accordance with the agreement between the school and its business/industry partners, while the vocational training component is the responsibility of each school's partner institution in the implementation of the placement (Arfandi & Makasar, 2009). Thus, the partnership between VET schools and industry is no longer an optional extra but a necessity. In practice, industry plays an active role in industrial work practice in the industrial class of SMK Muhammadiyah 2 Ajibarang.

3.3 Evaluation

3.3.1 Evaluation of learner activities

Evaluation of learners' activities can be done by administering tests. According to Hidayat (2014), a test is a set of questions or exercises and other tools used to measure skills, intelligence knowledge, abilities or talents of individuals or groups. In a classroom, the test has a dual function of measuring the success of the students and measuring the success of the teaching programme (Hidayat, 2014). There are three types of tests, namely:

(1) Diagnostic tests are tests used to identify a student's weaknesses so that the right treatment can be given.
(2) Formative testing, or formative evaluation, is used to determine the extent to which students have been formed after following a particular programme. This type of research is also used to improve the teaching and learning process.
(3) Summative tests or summative evaluations are carried out at the end of a programme or subject. This type of research is used to determine the rate of progress of student learning outcomes.

In the Daihatsu class and the Honda and HItachi class, the evaluation of the students is a formative test in the form of an exam at the end of the learning material, and the summative test itself is a test at the end of the semester, which is carried out every semester. What distinguishes the regular classes from the industrial classes is the existence of a certification issued directly by the company, which proves that the students have special expertise in the field directly held by the industry. This gives the students an added value when looking for a job in the future.

3.3.2 Evaluation of industrial class organisation

Programme evaluation includes monitoring, assessment and control. Programme evaluation can be effective if it is complemented by the function of monitoring, which is the continuous and ongoing observation of a programme or project. Evaluation can also be effectively useful when it is complemented with other functions, such as controlling the programme to keep it within the quality corridor and having the authority to control the level of service assurance to both users and stakeholders. The function of evaluation is also to provide feedback on the process of running the institution, but what is more important is that in the feedback there is an empowerment function that assesses all the components in the performance of the programme so that the programme has added value within a reasonable and accountable framework.

Monitoring is an ongoing information-gathering activity designed to provide programme managers and stakeholders with early indications of progress and shortcomings in programme implementation, so that improvements can be made to achieve programme objectives. Evaluation is a planned activity to objectively assess the performance and success of an ongoing or completed programme, in particular to answer questions about the extent to which programme activities contribute to the achievement of predetermined outcomes/impacts.

In the evaluation of industrial education there is monitoring in the form of curriculum reviews and meetings between the school and the expertise programme on the obstacles encountered in the implementation of industrial education. In addition, monitoring is also carried out by industry and schools in the form of visits both from schools to industry and from industry to schools to discuss the difficulties faced by students, the implementation of the curriculum and learning in industrial classes and the development of industrial classes.

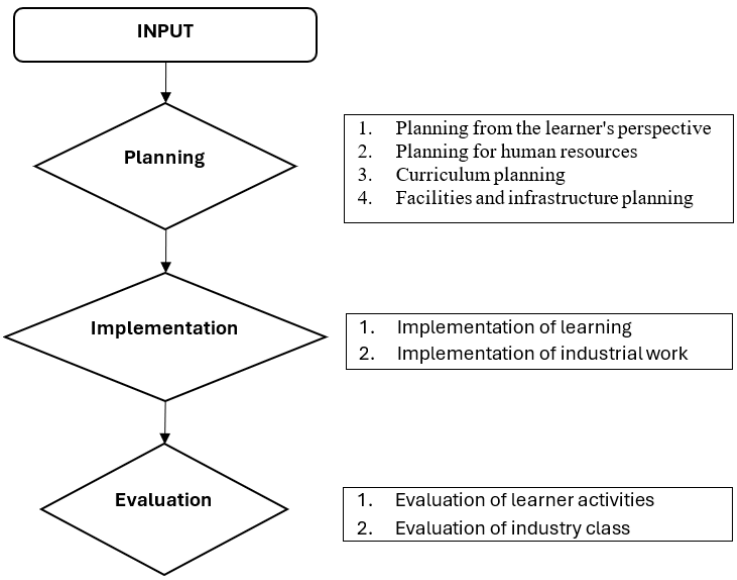

Figure 1: Findings on the management of vocational industry classes

IV. CONCLUSION

4.1 Industrial classroom planning

Industrial class planning in terms of students, human resources, curriculum and infrastructure, the planning carried out is as follows:

a. The planning of students in the three industrial classes is carried out by the industry and the school as the organiser. In the Daihatsu class, it is carried out by selection in the form of tests and the quota in the Daihatsu class is 30 students. In Honda, it is carried out through selection in the form of tests and the quota for the Honda Class Programme class is 36 students. Hitachi class with a quota of 30 students.
b. Personnel planning in this industrial class is carried out by the industry and the school. There is no recruitment in these three classes as the instructors who teach are drawn from the instructors of the individual competence programmes in their respective industrial classes. In order to be able to provide material to the students, the training of the instructors is carried out by the industry.
c. Curriculum planning involves industry and schools in its preparation. The involvement of industry and schools takes the form of synchronising the curriculum derived from the school curriculum with the needs of industry.
d. The planning of facilities and infrastructure involves the school and industry in its procurement. The industry plays a role in setting industry class standards and making procurements, and the school plays a role in fulfilling procurements not made by the industry.

4.2 Implementation of industry classes

The implementation of this industrial class is divided into 2, namely the implementation of learning in industrial classes and the implementation of industrial work practices. The industrial class consists of Daihatsu class and Honda class programme. The evaluation of the industrial class is as follows:

a. Implementation of industrial classroom learning based on a predetermined curriculum using the method of self-study or giving worksheets (assignments), in class and practice.
b. In the Daihatsu and Honda classes, the industrial programme plays a role in the placement and assessment of students' industrial placements by providing assessment forms from the school to the industry that is used as a placement site for the students.

4.3 Industry class evaluation

The evaluation of industrial placements is divided into two parts: the evaluation of student learning outcomes and the evaluation of the implementation of industrial placements. For the evaluation of student learning outcomes, the form of industry linkage is the provision of certificates issued directly by the collaborating industry. For the evaluation of the implementation of industrial education, there is monitoring in the form of curriculum reviews and meetings held by the school with the expertise programme, and monitoring in the form of visits, both school visits to industry and industry visits to schools, which aim to find out the development and difficulties faced by industry and schools in organising industrial education.

Based on the discussion and conclusions, the authors makes the following suggestions:

a. In planning industrial classes, the researchers suggest that schools should be more selective in planning the formation of industrial classes by paying more attention to the suitability of industrial partners with school needs.
b. The implementation of industrial classes at SMK Muhammadiyah 2 Ajibarang is good because in the implementation of industrial work practices, all students have been channelled to industries that collaborate with these industrial classes. The researchers suggest that in the future, schools can collaborate with industries to develop other industrial classes at SMK Muhammadiyah 2 Ajibarang, including in the machining, light vehicle and motorcycle engineering programmes.
c. So far, monitoring and evaluation of industrial classes has been carried out regularly, but the timing of monitoring and evaluation is still unscheduled and not coordinated with schools. In this condition, the researcher suggests that industry and school should further strengthen the coordination, especially in the planning of monitoring and evaluation.

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