Learning Management for Vocational High Schools in the Industry 4.0

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Abstract— **This paper aims to describe Information and Communication Technology based learning management in Vocational High School in relation of Industry 4.0. The research used descriptive method with qualitative approach. The research was conducted at SMK Muhammadiyah Bandongan in Magelang Regency. The data are acquired from detailed interviews with the school principal, teachers, and students. Furthermore, the researcher also observes the learning process in the school and identifies the documents regarding the learning plan including the syllabus and learning plan. The validation of the data is done through a sort of source and technique triangulation. The analysis of the learning management through the following four principles (a) planning, (b) organizing, (c) actuating, and (d) controlling. The shows that the learning process has been planned thoroughly by composing syllabus, teaching plan, and identification of learning equipment's which are required in the beginning of the school year. IT-based learning management in this school has been implemented in accordance with the principles of good management. This learning method has been applied accordingly referring to the present plan and syllabus by most teachers in the school. One of its learning activities which use android based smartphone as its media has significantly increased enthusiasm amongst its students. However, there are problems the school are currently facing, such as the quantity of android based phone which are limited so the students have to use their own phones, the e-learning media that is still under maintenance.**

Keywords—learning management; information and communication technology; industry 4.0

I. INTRODUCTION

The rapid advancement of technology alongside with the evermore dynamically progressed era has made abundant effects on worldwide economics and industrial field. In the meantime, the world has entered the era of Industry 4.0. Industry 4.0 originated from Germany government vision regarding advanced technology strategy which utilizes information and communication technology [2]. Revolution of Industry 4.0 is a combination of digital domain, physic and biology [8]. In Industry 4.0, the world mainly focuses on improvement on production by utilizing the latest technology and substituting human resources with technology.

According to Durmus, industrial revolution 4.0 can be considered as the industrial digitalization which connects all the structures in the production system by making a use of digital technology such as the Internet [3]. This inevitably brings numerous effects to mankind in so many fields such as economics, education, and socio-culture. As a result of this revolution, people are required to be open-minded and thoroughly plan a strategy to challenge their selves to make innovations.

The era of Industry 4.0 has established new challenges and competitions in numerous fields, including job vacancies. There have been changes in the industrial world, such as the presence of the Internet and robotic devices which are installed to subtract the number of human resources to boost efficiency. Every job seeker is obliged to have their own selling point in order to keep up in this era of digitalization. This has become one of the challenges which Indonesian educational system has to face with the goal to prepare its young generations to compete in their own specialism.

According to Samani, the era of Industry 4.0 is dominated by the technology of information [7]. Working and industrial world in which vocational school graduates are working will also be affected by the revolution. As stated by Clifton vocational schools, which specialize in teaching their students to practical skill are deeply affected by the Industry 4.0 since various of manual works are being replaced by the use of technology advancements such as computerized programs, the Internet, and robots [7]. This unavoidably has become a challenge for those school to prepare their students to adapt themselves to the rapid changes. Thompson, states that the principal of vocational education is to direct the society to a variety of specialized occupancies which are highly demanded in the job market [6].

Puncreobutr states that learning management in the Industry 4.0 is compelled to facilitate students so that they are able to operate the up-to-date technology for it will be beneficial for them in this fast-paced era [4]. Furthermore, it is such a necessity for vocational school students to have a meticulous understanding on recent information and communication technology in order to adapt and compete in the job market. The appliance of information and communication technology as a learning media aims to engage the students in interactive, inspirational, and fun learning activities in accordance with the nationwide standardized education obligation. PP RI No. 19. Year 2005 declares that

"Learning activities in institutions if education are conducted in an interactive, inspirational, fun, challenging

condition and motivates its students to actively participate, and act as a means to develop their initiation, creativity, independence in line with their talent, interest, also their physical and psychological development."

In a learning context, Budiana, Sjafirah, & Bakti states that information and communication technology holds 2 roles as a media to present the learning and as individual learning media or E-learning [1]. Information and technology information as a media to present the learning can be in the form of power point presentations or even videos. Meanwhile, electronic based learning or e-learning can be conducted by operating websites, e-mail, the Internet, and android operation.

By applying information and communication in learning process, students are encouraged to acquire information which is beneficial for them by themselves and to adapt themselves to the digital world. The success of this learning certainly requires good management. The management function according to G R Terry is divided into four, namely planning, organizing, driving and controlling (POAC). Planning can be defined as a collection of decisions, as actions to prepare actions for the future by making decisions now. Organizing is the division of tasks or jobs, division, audit, namely: the types and amounts of work to be completed, the number of people involved in the organization, and different abilities, interests, talents for work. Actuating is an effort to mobilize group members in such a way that they are willing and trying to achieve predetermined goals. To ensure that all matters are running as they should, management must monitor the performance of the organization.

Based on the description above, we can conclude that the implementation of information and communication technology-based learning is very important to be implemented in order to face the technological era 4.0, especially for the Vocational High School level. This is intended to prepare graduates who are ready to compete in today's world of work and industry, which have entered the digital era. of course the success of learning requires good management. Learning management here is viewed from its four main functions, namely planning, organizing, actuating, and controlling.

This research focuses to understand empirical reality of learning management which is applied by SMK Muhammadiyah Bandongan, Kabupaten Magelang in the Industry 4.0. Thus results in four research questions: (1) How is the learning plan in SMK Muhammadiyah Bandongan? (2) How is the learning organizing in SMK Muhammadiyah Bandongan? (3) How is the learning actuating in SMK Muhammadiyah Bandongan? And (4) How is the learning evaluation in SMK Muhammadiyah Bandongan. In line with previous explanations, this paper aims to acquire information regarding learning management of SMK Muhammadiyah Bandongan in the era of Industry 4.0.

II. METHODS

In order to conduct this research, the descriptive method and qualitative approach are applied. Data are taken purposively in SMK Muhammadiyah Bandongan Kabupaten Magelang. They are acquired from an intensive interview with the school principal, 3 teachers, a teacher who also has a role as

the school equipment manager, and 5 students. Furthermore, the researcher also observes the learning process in the school and identifies the documents regarding the learning plan including the syllabus and learning plan. The validation of the data is done through a sort of source and technique triangulation. The source triangulation is carried on by checking if the data which were acquired from the interview, observation, and library study are matched. Meanwhile, the technique triangulation was done by analyzing the data concerning the practice of the information and communication technology based learning management through the school principal, the teachers, and the students.

Learning management here is viewed from its four main functions, namely planning, organizing, actuating, and controlling. As Miles & Huberman (Sugiyono, 2018: 133) stated, analyzing qualitative data includes data collection, data reduction, data display, and conclusion drawing or verification.

III. RESULTS AND DISCUSSION

SMK Muhammadiyah Bandongan is a private funded vocational school located in Kabupaten Magelang which is currently applying digital technology in their learning activities. This vocational school has three vocational classes, which are Light Vehicle Engineering, Computer and Network Engineering, and Pharmacy. Facing the Industry 4.0, SMK Muhammadiah Bandongan has makes it compulsory for its teachers to make use of Information and Communication Technology in their teaching method, such as by doing presentations through *power point,* e-learning, browsing the Internet, using e-mail, and operating Android system. The aim of all these is to familiarize the students with digital technology.

The principal of SMK Muhammadiyah Bandongan has stated that his students have been ungainly in using digital media in the learning process, especially in the Light Vehicle Engineering class. The cause is that the theoretical and practical learning has always been done conventionally. This eventually becomes a serious concern for the school considering that it is such an obligatory to have skill in understanding and operating digital devices in order to survive in the job market. Nevertheless, there is also the computer-based National Examination which the students have to pass in their last year. Moreover, in order to prevent the students distracted by their own android based cellular phone, the school has regulated its teachers to make use of android phones in their teaching activities.

Eventually, the success of this program depends on how the school manages the learning process. Below are the descriptions on how SMK Muhammadiyah Bandongan manages their learning process.

A. Planning

Before the actuating step, the school plans the learning process by composing syllabus and teaching plan. The planning is done in a sort of process including a technical meeting in the beginning of the school year. The planning is then followed by identification of the equipment which are needed to support the learning process, and then the result is

informed to the person in charge of managing the school infrastructure.

B. Organizing

Infrastructures are provided by the school to support the learning activities. The equipment provided are laptops, LCD screen, a computer laboratory, android phones, e-learning, websites, and a strong connection *Wi-Fi*. However, there are problems the school are currently facing, such as the quantity of android based phone which are limited so the students have to use their own phones, the e-learning media that is still under maintenance. Moreover, the schedule on the utilization of computer laboratory is not yet fixed so clash between classes going are unavoidable.

C. Actuating

Learning activities are conducted based on the planning that was composed in the beginning of the school year. During the learning process, the students are encouraged to use e-learning system that is provided by the school even though it still needs improvement. In both individual and group task, the students are encouraged to explore their knowledge by using the Internet and send the assignments through e-mail. There are also teachers who utilize game on android phones in their teaching activities.

The utilization of android phones in learning activities has resulted in the increasing enthusiasm among the students. However, there are some classes in which information and communication technology are not applied and in reality there are still a number of teachers especially the elder ones who do not apply the syllabus and the teaching plan.

D. Controlling

The school principal has an important role in this step as he must always be active in controlling the teaching and learning activity. The reason is that controlling is essential and needed to evaluate the success of the program that has been planned and to identify the existing problems and the solutions. This role has been performed by the school principal in even though not that maximally as the time is limited.

The various activities which the principal has to do causes the principal not able to do the controlling by himself. The controlling is usually done by receiving reports from teachers regarding the teaching and learning process including the progression and the problems they faced. However, the principal occasionally does the controlling in classes by himself. The reports are then used as evaluation matters. Problems such as network failure and broken equipment can be fixed immediately. On the other hand, problems such as shortage of learning facilities and those regarding monetary fund will be discussed in the school meeting.

IV. Conclusion

The implementation of information and communication technology-based learning is very important to be implemented in the face of the industrial era 4.0. This ICT-based learning has been implemented by SMK Muhammadiyah Bandongan

by paying attention to its learning management. The results obtained in this study are; (a) In terms of planning, ICT-based learning in this school has been well planned through the syllabus and lesson plans. (b) Learning organizing is constrained by the limited number of android-based cell phones owned by schools, e-learning media that are still new and still in the development stage, and constraints on the distribution of schedules for using computer laboratories that are not well organized. (c) The learning actuating is carried out in accordance with the learning plan that has been prepared in the syllabus and the learning plans. The positive thing that was found in its implementation, namely the use of android media, turned out to create extraordinary enthusiasm for students in participating in learning activities even though there were several obstacles in its implementation. (d) The controlling function is carried out by both the principal and staff. The results of supervision and reports received about learning are then used as evaluation materials for a better learning process in the future

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