

E-Learning Implementation Facing The Industrial Revolution 4.0 (Case Study in SMP N 2 Purworejo)

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Abstract. This aims to (1) describe the lesson plan by the teachers based on E-Learning; (2) describe the learning process by the teachers based on E-Learning; and (3) describe the evaluation technique based on E-Learning by the teachers. This research is descriptive qualitative which the data is not numeric, and aimed to explore the meaning of the phenomenon. The Source of research data obtained from teachers, student, headmaster and parents. The Data were collected by: (1) Observation; (2) interview; and (3) document. The data analysis was performed by using (1) inductive, and (2) interactive model which consists of data reduction, display data, verification and conclusion. The study results in several findings, first, description of the lesson plan by the teachers based on E-Learning; (2) description the learning process by the teachers based on E-Learning; and (3) description to describe the evaluation technique based on E-Learning by the teachers.

Key Word: Implementation, E-Learning, Industrial Revolution 4.0.

1. Introduction

Human efforts to improve their quality of life are carried out through various innovations in science and technology. The development of science and technology continues to be done through a process of observation, experimentation and theoretical criticism so as to give birth to laws, paradigms, new theories and new technologies. Thus science and technology are continuum processes that never stop to discover the truth of science and create efficiency and ease of activity, through the stages of thesis, antithesis and synthesis.

The empirical facts show that technological progress can overcome a number of problems and obstacles faced by humanity. In the Industrial Revolution 1.0, produced a variety of machinery products that impacted the mechanization process which replaced human and animal power for work in agriculture and industry. During the Industrial Revolution 2.0, the change was marked by the development of electrical energy and the driving force. In this era, manufacturing and mass production took place. Telephone, car, and airplane are the highest examples. Changes occur quite quickly in the Industrial Revolution 3.0, which is marked by the growth of electronics-based industries, information technology, and automation. The digital technology and the internet dominate communication and information systems so that they can overcome the problems and obstacles of space and time.

The development of new thoughts and innovations after the Industrial Revolution 3.0 has given birth to the Industrial Revolution 4.0. Currently, we are in the era of the Industrial

Revolution 4.0 marked by the development of the Internet of Things (IoT), the internet for all things. The technology can connect various things such as products, services, places and others as well as humans (Klaus Schwab, 2016: 19). Megatrends of physical technology products can be easily recognized, among others: (1) automatic vehicles; (2) digital 3-dimensional mapping; (3) smart robots and (4) new materials (Klaus Schwab, 2016: 15-18). Many things that were not imagined before, suddenly appeared and became a new innovation, and opened up a very large business area. The emergence of transportation with ride-sharing systems such as Go-jek, Uber, and Grab. The presence of the Industrial Revolution 4.0 indeed presents a new way of life, new businesses, new jobs, new professions that were never thought of before.

To welcome the Industrial Revolution 4.0, the Purworejo Regency Government seeks to utilize information technology to support the Government's operational activities. To that end, the Regent of Purworejo in 2017 launched Smart City. Purworejo Regency Government is determined to realize Smart City which is more directed at developing optical fiber networks, information applications and human resource development. To support the program, in 2018 the Purworejo Regency Government will install 20 warehouses that can be accessed free of charge by the public. By using a fiber network system, it is expected that all information can be accessed by all members of the community, especially Purworejo, including online licensing, online hospitals, online health and others.

The presence of the Internet of Things is both a challenge and an opportunity for the world of education. Called a challenge because not all educational institutions ranging from primary school, middleschool to high school even universities have adequate internet facilities and support of human resources who have the competence to use the internet to improve the quality of the learning process. It is said to be an opportunity because the presence of the Internet of Things provides new hope for improving the quality of learning that is more productive and innovative by utilizing internet media.

The use of electronic media in education is expected to improve the quality of the process and learning outcomes. By using electronic media, subject matter that students must master is delivered in a variety of varied forms, namely through audio, visual and audiovisual. Electronic media can display messages and knowledge in various formats simultaneously such as text, graphics, audio, video and animation in one program package. Thus, electronic media is able to serve each individual according to the talents and abilities of each student. In addition to being able to provide services in accordance with students' interests and talents, electronic media can increase student motivation, encourage students to think creatively and improve student memory.

E-Learning is a learning model that utilizes electronic media and cyber media in the learning process. With this learning model, it is expected that a more effective, time-efficient, productive and innovative process of transforming knowledge, attitudes and skills. At present, especially in the Purworejo Regency area, there are many schools that use electronic media in learning activities including Tape Recorder, computers, LCDs and so on. Meanwhile, schools that use cyber media (internet) in learning activities are still very limited. Such educational conditions certainly cannot be expected to be able to contribute optimally to the realization of Purworejo as a smart city.

2. Method

The data used in this study were students and teachers of SMP N 2 Purworejo. Research data obtained from various sources directly involved in the learning process with the E-Learning model, namely teachers, students and principals, or indirectly involved, namely

parents. The data obtained from the teacher in the form of teacher activities in preparing learning plans, implementing learning and evaluating learning outcomes. Types of data from students in the form of student activities in the learning process and the value of student learning outcomes. Types of data from the principal include the principal's policy in implementing E-Learning and supporting facilities. Meanwhile, data from parents in the form of motivation and facility support for the smooth implementation of learning.

Observation of the learning process is done both in the classroom and outside the classroom. Types of observations carried out in research are non-participant, namely observations where the researcher does not involve himself in the lives of the people observed. Technically in conducting observations, researchers used a check list that contained aspects related to learning media, teacher and student activities, teacher and student interactions, student interactions with learning resources other than teachers and motivation in the learning process. Interviews were used to obtain data about the opinions, experiences and knowledge of teachers and students about the application of the E-Learning model. This technique is used to obtain data about the policy of implementing E-Learning, learning design and assessment prepared by the teacher, learning resources in the form of textbooks and student grades.

3. Discussion

Implementation of E-Learning

Innovation in learning needs to be done continuously so that the quality of the process and learning outcomes increase. Therefore, conventional learning models that are still centered on teachers and students only as learning objects need to be abandoned. The learning model needed now is a learning model that encourages students to think actively, creatively and innovatively so that they have adequate learning experiences in order to construct their knowledge. To realize the interactive and innovative learning process, SMP N 2 Purworejo facilitates teachers to develop learning models of E-Learning.

SMP N 2 Purworejo already has 4 computer laboratories, human resources and students who are able to implement e-learning. On the other hand, the Department of Education, Youth and Sports, Purworejo Regency has facilitated SMP N 2 Purworejo by providing E-Learning applications. The application is still limited so teachers must create their own content to complete it. The implementation of e-Learning in SMP Negeri 2 Purworejo has actually been implemented in a limited manner by several teachers before there was an appeal from the Department of Education, Youth and Sports of Purworejo Regency.

E-Learning Policy

School policy in implementing E-Learning

Electronic-based learning or E-Learning is a learning model that utilizes electronic media to improve the effectiveness of the learning process and student learning outcomes. Electronic media that can be used in the learning process include OHP and LCD, tape recorder, film, computer and internet. In general, schools have used electronic media in learning activities such as the use of tape recorders for English lessons, LCDs and computers in a variety of subjects. However, there are still very few schools that implement E-Learning by using the internet to support learning activities.

SMP N 2 Purworejo is one of the schools in Purworejo Regency that has implemented E-Learning by utilizing the internet network. The school's commitment to implement E-Learning is outlined in the School Principal's decree Number 800/073/2018. The purpose of schools in implementing E-Learning is basically that students are more motivated to

participate in learning because the E-Learning model has a variety of learning resources, encouraging students to be active, creative and productive which will ultimately have an impact on increasing student achievement.

Fulfillment of E-Learning facilities

To support the implementation of E-Learning, SMP N 2 Purworejo has provided infrastructure in the form of 4 computer laboratories, with 105 computers installed. With the details of 3 computer laboratory rooms each containing 25 units of computers and 1 room containing 30 units of computers. To optimize the operation of the computer laboratory, 4 servers were installed, a local area network (LAN), an interconnection network (Internet) with a speed of 80 Mbps and an operator.

Implementation of E-Learning

To support the implementation of E-Learning in SMP N 2 Purworejo, teachers have been included to attend workshops facilitated by the Department of Education, Youth and Sports, Purworejo Regency. During 2018, there were two workshops on E-Learning that were participated in by teachers in Purworejo Regency including teachers from SMP N 2 Purworejo. The first workshop was aimed at introducing e-learning applications while the second workshop was about updating the new version of E-Learning applications (interview with Ari, ICT subject teacher at SMP N 2 Purworejo). Before the teacher implements E-Learning, the teacher needs to prepare a learning plan as outlined in the lesson plan. In SMP N 2 Purworejo the teacher has not prepared a "RPP" (learning implementation plan) and syllabus with a special format on subjects that have implemented e-learning. The "RPP" (learning implementation plan) and Syllabus in e-learning are still the same as the "RPP" (learning implementation plan) and Syllabus of subjects that have not implemented e-learning, which distinguishes only learning resources and media. The main learning source in E-Learning is internet material compiled by the teacher. The media written in the "RPP" (learning implementation plan) is the internet (Interview with ICT subject teachers at SMP N 2 Purworejo: Ari)

In SMP Negeri 2 Purworejo, not all teachers apply E-Learning. Teachers who have implemented online-based E-Learning are still few in number, those who teach science, mathematics, English, Indonesian, social studies, and ICT subjects.

As for teachers who have not used internet-based E-Learning, they carry out learning using computer media and LCD projectors. There are also teachers who use the Kahoot application to find out the competencies of students against the concepts that have been explained. Kahoot is a free learning platform based game, as an educational technology. This application provides an exciting learning experience, not only for students, teachers also enjoy the application.

The technique used by the teacher to open the e-learning process is almost the same as the technique of opening the learning activities manually. Likewise the techniques used by teachers in motivating students. The difference is only in the use of media and learning resources that are internet based. Because learning is done in a computer laboratory, at the beginning of learning the teacher explains online learning procedures such as the procedure to turn on the computer, enter the network, open the web / google / youtube to search for material with the address specified by the teacher, do the assignments, presentations and report it to the teacher.

The methods used by the teacher are lecture, Problem Base Learning, FGD and Presentation. In English subjects, the teacher assigns the task to students to learn conversation,

by giving examples of how to read it first, then playing the role recorded in video format, after it becomes a video, they sent to the teacher for correction.

During the learning process in a computer laboratory, students make observations and search for information through online media about various materials / competencies that must be mastered. The learning resources used are content from the Purworejo Regency Education Office, web, blog, google or youtube. The learning resources from the Purworejo Regency Education Office can be accessed at the web address <http://92.168.0.100/elearningsmp>. The Education Office website address contains text, image and video-based subjects with two types of curriculum, namely KTSP and K-13. When students find difficulties in understanding the material, they ask the teacher directly or do not use online media.

Teacher interaction with students is done manually, not online, such as using chat or Edmodo. The teacher in providing motivation, delivery of procedures, and advice is done manually or verbally. Class discussions are not done online because the school does not have the tools to support these activities. With the model of direct interaction between teacher and student, the teacher can build emotional closeness between students, as well as between teacher and student.

A number of problems encountered in implementing E-Learning are the fact that there are still a number of students from SMP N 2 Purworejo who are not yet skilled in using information technology, especially in E-learning activities. To overcome these problems, the school encourages students through activities / habituation that uses computers. During the learning process, there are also some students who actually play the game. To overcome these problems, during learning, the teacher must go around to all students to monitor student activities to focus on subjects. Besides using this method, learning is carried out by two teachers so that student learning activities can be monitored. Another obstacle encountered in implementing E-Learning is that not all computers have speakers. So that in certain subjects such as English with basic competence is listening, then it is not achieved.

Another problem is the teacher factor, especially the ability and motivation of teachers in the application of E-learning. There are still some teachers who are not yet skilled in using computers in learning, so they need technical assistance. Likewise, aspects of teacher motivation to complement the content of E-Learning applications are also still low. The Department of Education, Youth and Sports of Purworejo Regency has facilitated providing content, but the content provided is still very limited and often the content provided is not in accordance with the learning objectives, so teachers must complete it. However, in reality there are still very few teachers who want to implement it. One reason is the frequent changes in the curriculum.

The number of school activities to meet national education standards, indirectly preoccupy the minds and staff of the Principal along with the teachers so that it has an impact on the quality of learning of the E-Learning model. Although there are a number of obstacles, the implementation of E-Learning can still run even if it is less than optimal. Some factors that support the implementation of E-Learning are as follows:

- 1) Support from parents of students by facilitating students who study at SMP N 2 Purworejo by buying laptops and providing internet networks at home.
- 2) The ability and understanding of students in mastering technology is quite adequate at around 80%, while 20% need more intensive guidance on the use of computers.
- 3) Support from the Department of Education, Youth and Sports at Purworejo Regency during the leadership of Dr. Ahmad Kasinu, by inviting me as the principal at SMA N 07 Purworejo to propose a theme and form an application team. I motivate teachers to apply digital technology in education.

- 4) The procurement of workshops for teachers by the Department of Education, Youth and Sports has been held 2 times since 2017 with the introduction and improvement of applications. Concentrate content from text, images and videos.
- 5) Facilities and infrastructure in SMP N 2 Purworejo that have met the requirements for the application of E-learning, namely 4 computer laboratories, LAN and digital libraries in the form of ebooks.

Assessment of learning outcomes based on E-Learning

Assessment in the form of assignments, the teacher gives assignments to students in two kinds of forms. If the assignment is in the form of multiple choice questions then it can be done online, but if the assignment is in the form of an essay then it is given on paper basis. Essay assessment is given in the form of paper based because there is no system that can automatically correct the type of essay questions. MCQs and essays are both tested on students in different forms. In carrying out daily tests, teachers use the Local Area Network (LAN) and SITENDIK applications, while for the final semester assessment (PAS) teachers must use essays. In compiling questions online, the teacher arranges the questions manually based on paper (paperbased), then uploaded online including making games for learning. All teachers are required to give daily tests online, even if only once a semester. To overcome the possibility of collaboration between students in working on objective questions, the teacher needs to randomize the questions or the new version of the application by hiding the answer options (Interview with ICT teachers in SMP N 2 Purworejo: Ari).

4. Conclusions

Based on the research data obtained and the results of the discussion above, it can be concluded as follows:

- a. SMP Negeri 2 Purworejo in implementing E-Learning using a laboratory model. There are 4 computer laboratories with 105 computers installed, with 3 computer laboratory rooms where each room contains 25 computer units, and 1 room contains 30 computer units. To optimize the operation of the computer laboratory, 4 servers were installed, a local area network (LAN), an Interconnected Network (Internet) with a speed of 80 Mbps and an operator. With these facilities, each student can access learning resources online.
- b. Not all teachers in SMP Negeri 2 Purworejo implement E-Learning that utilizes the internet as a medium and learning resource for students. The teachers of SMP Negeri 2 who have implemented E-Learning are English language teachers, Information and Communication Technology teachers, Indonesian Language teachers, Social Sciences teachers, Science and Mathematics teachers.
- c. Teachers who implement E-Learning, compile a Learning Implementation Plan (RPP) referring to the principles (1) pay attention to individual differences in students; (2) encourage active participation of students; (3) developing a culture of reading and writing; (4) provide feedback and follow up; (5) interconnection and integration; (5) applying information and communication technology.
- d. The learning model applied by the teacher is problem based learning with the steps: (1) the teacher explains the competencies to be achieved and mentions the supporting facilities or tools needed. Motivate students to get involved in problem solving; (2) the teacher helps students define and organize learning tasks related to the problem; (3) the teacher encourages students to gather appropriate information and then do problem solving; (4) the teacher helps students in delivering problem solving reports to be sent to the teacher's email address; and (5) at the end of the lesson, the teacher does not make reflections to find out the mastery of student competencies about the subject matter being studied.

- e. To measure the achievement of learning objectives, the teacher uses the test instrument in the form of multiple choice. The test is done online in the computer laboratory room. The results of student answers are sent to subject matter teachers via email. After all student answers are sent, the teacher carries out the correction manually.

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