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### A Critical Analysis of Educational Technology in The Era of Industrial Revolution 4.0

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#### Abstract

Education is one of the most important things to create a generation of people who are ready for the changing times. It takes careful preparation in preparing good education through learning that illustrates the current condition of the world. This study aims to determine the tasks and roles of teachers, the use of learning resources and media in economic learning and the way teachers respond to change, the role of schools in facilitating economic learning, the education system applied in economic learning, and the impact on students. This research method is included in qualitative research with an active participatory research approach. The resource persons of this study were the teachers of Malang State High School 8, grade X and XI, four students with two students from class X and two students from class XI, Waka Curriculum, and Waka Facilities and Infrastructure. The instrument used in this study was the Observation Result Sheet and interviews. The results of this study indicate that there are teacher tasks that include teacher pedagogical and administrative tasks as well as implementation in learning, teacher learning resources and media, the role of school institutions that have provided facilities in the form of webmasters and internet bandwidth that have been enlarged, the education system that has referred to the education system the latest, and the impact on students varies depending on the learning style carried out by the teacher.

#### How to Cite

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## INTRODUCTION

The development of technology today has experienced rapid development from time to time. Currently, technological development has reached the fourth generation where the previous technology has been well integrated with other technologies in the network, which layman called industrial revolution 4.0. According to Hamdan (2018:1), the Industrial Revolution 4.0 is a new technological advancement that integrates the physical, digital and biological world, where there is a fundamental change in the way people live and work. Meanwhile, according to Prasetyo and Soetopo (2018:19), this era is an era in which all entities can communicate with each other in real-time at any time based on the use of internet technology and CPS (Cyber-Physical System) to achieve the goal of achieving new value creation or optimization pre-existing value of every process in the industry. Industrial Revolution 4.0 has fundamentally changed the entire order of life in the world. Easy access due to integrated technology makes it easy for humans to do activities.

Education is one of the fields that is very important to prepare young people to develop a country's civilization and to face the increasingly rapid development of the future. Therefore, good education must be balanced with qualified educational technology following current developments. According to the Association for Educational Communication and Technology (AECT, 1997), educational technology is a complex and integrated process involving equipment, ideas, procedures, people, and organizations to analyze problems, find problem-solving, evaluate and manage problem-solving related to all aspects of human learning. Miarso (2007:6), explains educational technology consists of five formulations as follows: (1) complex and integrated processes that include humans, tools, and systems, (2) carried out systematically to analyze and solve problems in the learning process, (3) fields that have an interest in the development, management, and use of learning resources systematically, (4) professions that are formed due to efforts in developing theories, conducting research and practical applications in daily life, as well as improving learning resources, and (5) operating integrally. Educational technology does not only cover instructional media, which has been widely developed.

Educational technology is not just a learning medium, but also includes teachers, learning resources, education systems, and school as institutions. The teacher as a facilitator in learning plays an important role in learning. According Suryosubroto (2009), the task of the teacher is the process of teaching and learning including pedagogical tasks and administrative tasks. The pedagogical task is the task of assisting, guiding, and directing students in learning. Suyono (2017) convey that teaching is not just transferring knowledge from people the teacher to students but helps students to construct their knowledge through activities related to real-life context (2015). While the tasks related to learning preparation and after learning are designing syllabus, lesson plans, as well as recapping grades of students.

Educational technology is increasingly developing, especially in the era of the industrial revolution 4.0, all components that are currently integrated through the internet and human life today are inseparable. According to Hudson (2001: 283), education based on life/atmosphere today is a vital component in solving problems in daily life, relevant to the needs and interests of the community, and can

adapt to social change and technological development. Besides, the impact of increasingly developing educational technology will also have an impact on developments in learning. Hasibuan (2015) explains that the information and communication technology development allows teacher to use advanced instructional media that promotes better learning process.

Students who play a role as a learner in the classroom and is directly related to the learning process must be taken into account seriously. During the learning process in the classroom, students are the one who perceived whether the instructional media used by the teacher is good or not. Students' perspective upon it must also be regarded primarily to produce instructional media that is suitable and relevant to the needs of students to achieve learning objectives.

School is a place or institution that provides students an opportunity to learn and acquire knowledge. Thus, school must be able to provide a better process of learning to improve student's understanding. To provide better learning process, school is able to offer a suitable facility related to learning process. Abdullah (2018) affirms that facilities related to learning process provided by school significantly influence the effectiveness of teaching and learning process which equal to 96.6 percent as a result. In addition, school owns an authority and capacity to design a learning model (which is still based on the applied curriculum by central government)

Besides, schools also have the right to determine student curricula (apart from the Ministry of Education and Culture), one of which is by providing policies within the school both for students, teachers, and related parties for the smooth learning activities in schools. An example is the use of devices that are still controversial in their use in schools. From a journal written by Asmurti et al. (2017), from a study conducted by 4 schools with 2 schools that prohibit the use of devices in schools and 2 schools that free students using devices in schools with a total of 304 students from school respondents banned the use of devices in schools and 343 students who released students using devices in school, the result was that learning achievements for schools that allowed the use of devices was higher than the level of achievement that did not allow the use of devices in the school environment. But on the other hand, some schools still prohibit the use of devices in schools because the focus of students will be distracted if given the leeway to bring devices to school. This certainly also affects the level of student learning outcomes that only focus on material based on textbooks and sources from teachers with minimal development of material. According to the publication's text written by Saputra (2017), in a study of Class X students of Muhammadiyah 7 Yogyakarta High School with a sample of 30 students stated that there was a significant influence on the use of the device with student learning activities with the assumption that the higher the intensity of the use of the device, the greater the negative impact on student learning activities.

SMA Negeri 8 Malang is one of the favorite schools in Malang, East Java. This school is one of the pilot schools of the many schools in the city of Malang, East Java. Besides, the freedom of the teacher in conducting learning is seen in this school. This school frees students to carry gadgets making it easier for students and teachers to carry out learning activities.

In addition, the economy also experienced rapid development due to the industrial revolution 4.0. For example, online businesses have begun to emerge due

to the existence of online business platforms that can be operated on their respective gadgets. Furthermore, service delivery is also increasingly rapid and even diverse these days due to the presence of the internet. This certainly must be immediately analyzed by the teacher so the teacher can quickly adapt the times and direct students to be able to use it as much as possible and of course for something positive.

## METHOD

The research method used was qualitative with an active participatory research type. The instruments in this study were observation and interviews. Observations were performed to two economics teachers of class X and class XI, while interviews were conducted with the economics teacher, students taught by the teacher and each class represented by two students. Data analysis was conducted using both triangulation methods and source triangulation methods, where method triangulation was conducted to analyze data derived from the same data, i.e. interviews with data sources originating from teachers, students, curriculum waka, and facility and infrastructure waka, as well as source population conducted to analyze the same source through different methods applied to the analysis of data coming from the teacher with various methods.

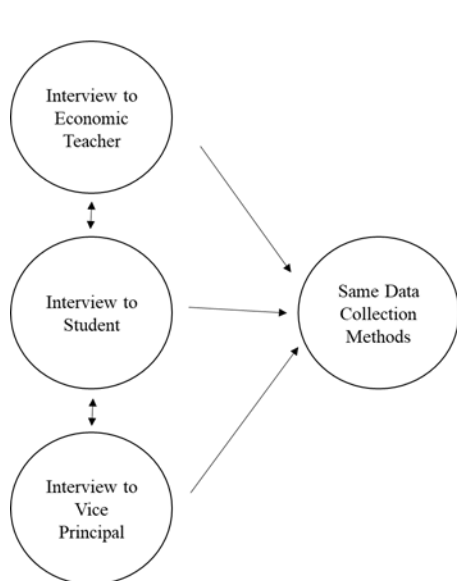


Figure 1a. Triangulation Methods

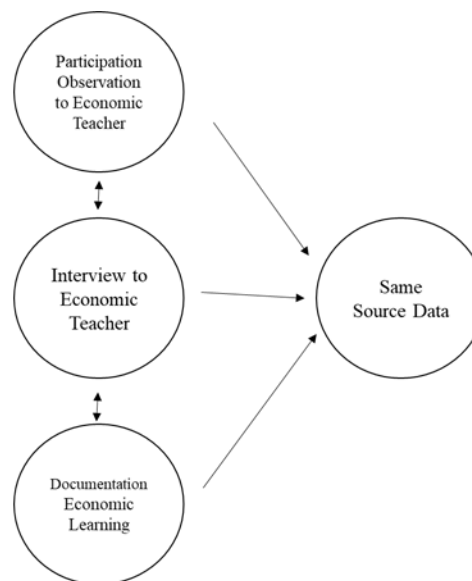


Figure 1b. Source Triangulation Methods

## RESULTS AND DISCUSSION

### Duties and Role of Teachers

Teachers are required to be professional in conducting learning, by fulfilling the following criteria: (1) Professional Ability, (2) Professional Efforts, (3) Time devoted to professional activities, (4) The suitability between expertise and work (Djojonegoro, 1996; Hariyanto 2004).

Therefore, the need for teacher professionalism is very important to be carried out by performing the duties and roles of the teacher to the fullest. However, the first Economics teacher cannot apply this. Besides, conducive classroom

conditioning has not yet done. The teacher only focused on delivering lesson content, not on how students mastered the competences of lesson contents gradually. To achieve a quality and efficiency in professionalism, it requires a strong personal commitment. Professional efforts must also be made by the teacher. In this case, this effort is assessed from how teachers can anticipate obstacles in carrying out pedagogical tasks such as when students playing smartphones during learning process as well as directing students to be actively involved in learning process.

In administrative tasks, a number of teachers have been supported by the presence of one sheet lesson plans, as well as digitalization in the current assessment that uses a paperless system (using school webmasters) therefore, the teacher's work is more well organized. However, sometimes what the teacher plans do not meet what was done. This situation is regarded common because of the uncertain environmental conditions. One available solution is that the teacher must also have a backup plan in addition to the written plan therefore, the teacher remains planned in carrying out learning.

The teacher's role must also be based on the concept of professionalism. In implementing teaching methods and strategies during the learning process in the classroom, teachers must totally be serious and earnest. When teacher pay attention to the professionalism during the teaching process, the learning process runs properly. Teacher's professionalism does not need to be blindly by force-feeding the material, but the seriousness is overflowing with a planned, following the plans that have been made both the initial plan and the backup plan.

Good professionalism will certainly impact on students' improvement of knowledge acquisition. Accordingly, one way to carry out the role of the teacher as an example in class is to be professional, such as coming on time and what the teacher's understanding in economics must be carried out following that understanding even though parents of students who are more affect the character of students than economics teachers, especially if the teacher is a favorite teacher in the school.

Magnificent professionalism will certainly impact on students' improvement of knowledge acquisition and behavior construction. When the teacher demonstrates professionalism during the learning process, the students will see it a positive example. Simple attitude to demonstrate teacher's professionalism is by coming on time to classroom.

When in school, teacher plays a role as students' parents. Teacher should be able to support them by giving proper advise and suitable control and management over students' behavior. In addition, it is important to establish good relationship between teachers and students in school to provide a convenient situation for students to learn in school.

Teacher also plays a role as learning facilitator in classroom. Thus, teacher is required to be professional in providing proper learning strategies. One form of professionalism of teacher is by designing alternative learning models and employing various form of media. Teacher must be able to design and develop learning strategies and media which are based on the current technology and knowledge development.

As assessors, teachers are required to be professional by conducting assessments based on the provisions in force in the assessment as well as conducting

an initial assessment of students' abilities and used as a basis for describing the conditions of students and learning at that time.

### **Learning Resources and Media in Educational Technology during the Industrial Revolution Era 4.0**

Learning resources and learning media in the industrial revolution 4.0 era have helped many teachers in learning, as in learning resources. But on the other hand, teachers must be able to integrate opinions that exist among students, provide positive and negative sides related to economic policies and decisions, and must also be critical with developments that then maximize the role of teachers as facilitators, both creating conducive learning atmosphere and creating material with its development. This can be done if the teacher possesses many references for one certain topic and not fixated on just one learning source. While in the learning media, teachers are introduced to numerous learning applications such as Quizzes, Google Scholar, and other applications that help teachers in learning. These numerous learning application based on recent technology allows teacher not to be occupied in preparing printed version of materials, as well, students can submit their works and assignments through application anywhere. The teacher is also assisted with a lot of instructional media that helps the teacher in explaining lesson topics such as LCDs, projectors, and speakers. Besides, internet access is one of the most important in digital-based learning that is expected to be used by teachers and students to find additional information related to the material that they will learn.

### **School Institutions as Digital Based Learning Facilitators**

The role of school institutions is to facilitate learning through facilities and infrastructure such as the expansion of Wifi bandwidth, the provision of special Webmasters of SMA Negeri 8 Malang, the presence of LCDs and projectors in each class, appropriate desks and chairs, and other learning tools such as blackboards and markers. In addition to facilities and infrastructure, school institutions also provide policies in the form of regulations allowing students to bring smartphones into school. School institutions also provide workshops for teachers, which sometimes involve state universities. Schools are also very responsive to the needs of teachers and students by meeting the learning needs which, according to teachers in general have been met. Besides, every year SMA Negeri 8 Malang always opens an enrollment of new student which is done through Integrated System of Students Enrollment.

### **Educational Systems Used in Economic Learning following the Current Era**

The education system in SMA Negeri 8 Malang related to learning refers to the latest Regulation of Ministry of Education, specifically The Regulation of Ministry of Education Number 37 of 2018 which was formerly The Regulation of Ministry of Education Number 24 of 2016. There are differences in the implementation of two regulations, where there is a new additional subject, namely Informatics Subject which allows students to learn about informatics technology and it is also related economics and digital business (stated within the latest revised version of the 2013 Curriculum).

### **Impact on Students**

According to Munandar (1999), the teacher and those involved must believe that: (1) Learning is very important and very enjoyable, (2) Children should be valued and loved as unique individuals, (3) Children should be active students, (4) Children need to feel comfortable in class, and are stimulated to continue learning, (5) Children must have a sense of belonging and pride in the classroom, (8) Children need to be free in an open discussion with both teachers and peers, (9) Cooperation is more valuable than the competition, (10) Learning experience that should be obtained through his life experience in the real world. Then the impact explained by Munandar (1999) must be present in every lesson. But that condition is not all students who take economics learning at SMA Negeri 8 Malang feel the effects of the methods taught by teachers who are different from each other. Class X students have less understanding related to economics compared to class XI. This is due to conventional learning so students do not understand what is discussed in the learning, while Class XI understands what is conveyed by the teacher because of the more varied ways and examples that are easily understood and taken from the lives around students.

### **CONCLUSION**

The task of the teacher in educational technology in the Industrial Revolution 4.0, the need for high professionalism as a teacher in carrying out the tasks and roles of teachers is more intensive than ever before. However, there are some teachers at SMA Negeri 8 Malang who have not yet reached professionalism in conducting learning, especially with the ease that is obtained by teachers should further enhance the professionalism of teachers in teaching. Besides, there are obstacles one of which is students who play smartphones while learning, and the teacher has overcome these obstacles through regulations on the use of smartphones. The diversity of learning media used in learning both through power points, LCD, projectors; use applications like quizzes, google scholar, and the like; even using applications that are commonly used by many people like What's App. While teacher learning resources do not only rely on textbooks but also books related to other fields of economics, as well as news or information around and the daily lives of students associated with economics. The role of schools in facilitating learning both for teachers and students has been very fulfilled. The education system in SMA Negeri 8 Malang has referred to The Regulation of Ministry of Education No. 37 of 2018 which is the latest regulation following Educational Technology in the Industrial Revolution Era 4.0. The impact on students due to learning is done is related to how the teacher's patterns of teaching students are. Students who lack knowledge related to economics are the impact of teachers who have less teaching methods following Educational Technology in the Industrial Revolution Era 4.0 and are less professional in learning, whereas students who have good knowledge of economics are the impact of teachers who have ways teaching that is following Educational Technology in the Industrial Revolution Era 4.0 and has been considered professional in teaching.

Economics teachers must be able to adjust to changes in existing educational technology. Not just teaching conventionally, but also must pay attention to student understanding. Because the development of technology from time to time will be more rapid so students must be prepared with the challenges of the age that had

never been thought of before. Economics teachers also need to improve teaching professionalism, including arriving on time, innovating learning following Educational Technology in the Industrial Revolution Era 4.0, as well as teacher assertiveness to students who are less controlled in using smartphones while learning. Besides, improving school management from time to time must be done even though researchers now have seen SMA Negeri 8 Malang has made many innovations that were not previously thought by researchers and certainly following the development of educational technology in the Industrial Revolution era 4.0.

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