

Improvement of Teacher Competence in the Industrial Revolution Era 4.0

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Abstract-This research was conducted to analyze the increase in teacher competence in the industrial revolution era 4.0. The era of the industrial revolution 4.0 has led to new technologies that have resulted in changes in various fields including education. Teacher problems are increasingly diverse entering the era of the industrial revolution 4.0. Teachers must have competence in facing technological developments. Efforts to improve teacher competency continue to be made from the teacher recruitment system, to the ability to teach students to have appropriate ways of thinking and perspectives to meet future challenges. This article aims to conceptually analyze the competencies that must be improved by the teacher. The results of the study show that efforts to increase teacher competency in the industrial revolution era 4.0 were carried out by improving teacher recruitment systems, bottom up patterns of teacher competency improvement, optimizing the Continuing Professional Improvement program and lesson studies with e-literacy support.

Keywords: *teacher competence, the industrial revolution era 4.0, the quality of education*

I. INTRODUCTION

Industrial development in the world has experienced a revolution that presents the industrial revolution era 4.0. The industrial revolution 4.0 is characterized by the presence of new technologies that emphasize digital economy, artificial intelligence, big data. Equipment, machines, sensors, and humans are designed to be able to communicate with each other using internet technology known as the "Internet of Things (IoT)" (Maria, Shahbodin, Pee, 2016).

The era of the industrial revolution 4.0 influenced the world of education. The use of digital technology in the learning process, increasing teacher competency, cannot be separated from the flow of information and technology development. Various challenges faced by teachers make teachers must be ready to face changes and be able to adapt. The teacher's role will not be replaced by any sophisticated machine. Teachers are still needed by students to form character, teach character, tolerance and the value of goodness. The teacher is also able to foster empathy, bring out the imagination and creativity of students.

Rapid changes in the world of education begin with strengthening teacher competence as the frontline in education. Teachers must change the perspective of education starting from teaching methods and educational concepts in accordance with the guidance of the industrial revolution era 4.0.

Education is currently required to be able to equip students with 21st century skills. These skills include the ability to think critically and solve problems, be creative and innovative, communication and collaboration skills. Students need to be taught to skillfully use technology and information. The abilities that must be possessed in the 21st century include: leadership, digital literacy, communication, emotional intelligence, entrepreneurship, global citizenship, problem solving, team working.

The teacher is not only limited to transferring knowledge to students. The role of the teacher cannot be replaced by any sophisticated technology in educating character, morals and being good for the students. Based on this description, this article examines efforts to improve teacher competence in the era of the industrial revolution 4.0.

II. DISCUSSION

The Industrial Revolution 4.0, laden with accelerated technological progress, has brought significant changes in all aspects including the education system. Changes in the education system also affect the role of teachers as educators. Teachers are required to increase competence to produce students who are able to answer the challenges of the industrial revolution 4.0.

Qusthalani in the learning home page of the Ministry of Education and Culture (Kemdikbud.go.id, 10 November 2019) mentions five competencies that must be possessed by teachers in the era of the industrial revolution 4.0, namely first, educational competence, internet-based learning competencies as basic skills; second, competence for technological commercialization. A teacher must have competencies that will bring students to have entrepreneurship with technology for the work of students' innovations; third, competence in globalization. Teachers do not stutter across cultures and are able to solve educational problems. Fourth, competence in future strategies. The teacher has the competence to predict precisely what will happen in the future and its strategy, by means of joint-lecture, joint-research, joint-resources, staff mobility, and

rotation. Fifth, competence counselor. The teacher has the competence to understand that in the future the problem of students is not only difficult to understand teaching material, but also related to psychological problems due to the times.

The 4.0 industrial revolution marked by super-fast technology will bring significant changes. One of them has an effect on the education system. Changes in the education system have an impact on the role of teachers as educators. Teachers are required to have high competence to produce students who are able to answer the challenges of the industrial revolution 4.0.

Qusthalani mentioned five competencies that must be possessed by teachers in the era of the industrial revolution 4.0, namely: 1) educational competence, internet-based educational / learning competency as basic skills. 2) competence for technological commercialization, having the competence to educate students to have an entrepreneurial attitude based on technology and students' work of innovation.

Next is 3) competence in globalization, a world without insulation, not stuttering about various cultures, hybrid competence and problem solver competence. 4) competence in future strategies, the world is easy to change and runs fast so that it has the competence to predict exactly what will happen in the future as well as the strategies to deal with it. 5) competence counselor. The future that will be undertaken by students has various psychological-related problems, stress due to increasingly complex and severe pressures, teachers are needed to be able to act as counselors. So if you want to improve the quality of teachers, the first thing to do is improve the quality of teachers.

Education in the industrial era 4.0 has three development components, including thinking, acting and living competencies in the world (Greenstein, 2012). The thinking component includes critical thinking, creative thinking, and problem solving. Acting components include communication, collaboration, digital literacy, and technology literacy. The components of life in the world include initiative, self direction, global understanding, and social responsibility.

Teacher competence in the industrial era 4.0 not only transfers knowledge but prioritizes 21st century competency development. Implementation of education refers to a new paradigm of education characterized by students as connectors, creators, and constructivists in the framework of the production and application of knowledge and innovation (Brown-Martin, 2017).

Efforts to achieve teacher competency can be started from the teacher recruitment system. Teacher recruitment is carried out through selective and standardized processes according to the needs of technological development. The teacher selection process not only tests intellectual and pedagogical abilities, but also tests the psychological and personality of prospective teachers in facing the challenges of the industrial revolution 4.0 era.

The changing world that is so fast has the effect of digitizing education. Nowadays, classrooms are more

open. The virtual world can also be a place for learning. Today's world faces the phenomenon of disruption by the digitization of the education system through the innovation of Massive Open Online Course (MOOC) and Artificial Intelligence technology applications.

MOOC is an online learning innovation that is designed to be open, sharing, connecting and networking with each other. Artificial Intelligence (AI) is an artificial intelligence engine that is designed to do specific work to help facilitate everyday human tasks. Artificial Intelligence helps individual learning, which is able to search for information and present it quickly, accurately, and interactively. MOOC and AI marked the era of the industrial revolution 4.0 in the field of education.

Classrooms have evolved towards digital learning. This creates learning that is more creative, participatory, diverse and comprehensive. The teacher has an important role to contextualize information and guide students during online discussions.

The teacher needs to change the way of teaching to be more fun and interesting. The role of the teacher changes as a seeder of knowledge to students, becoming a facilitator, motivator, inspirator, mentor, imagination developer, creativity, character values, team work and social empathy. If we are going to improve the quality of education, we must improve the quality of teachers first.

The teacher must be able to build an atmosphere to meet the psychological needs of students, consisting of: need for competence, every student needs to feel able. The teacher can give appreciation for the results of the effort and the process of student learning outcomes. Needs for Autonomy, every student needs to feel "autonomous" by gaining freedom and trust because every autonomous learner does not depend on the teacher in learning. Needs for Relatedness, every student needs to feel himself part of a group, and interact in groups. The learning process must be able to foster interaction and mutual support. Sustainable learning, aims to make students able to go through an era of disruption, and enter a new era called the abundant era, namely the abundance of information, media and learning resources.

Dinar in the article titled "Increasing Teacher Competence Towards the Era of the Industrial Revolution 4.0" writes (puslit.dpr.go.id accessed 10 November 2019) argues that efforts to improve teacher competence in the industrial revolution era 4.0 can be done by (1) teacher recruitment systems carried out by selective and standardized patterns according to the needs of technological development. (2) the pattern of increasing teacher competency is bottom up so that all problems and obstacles faced by teachers in the regions can be accommodated and then reviewed together. (3) continuous improvement of the teaching profession through the Continuing Professional Improvement program. The aim is to reduce the distance between the knowledge, skills, social competence, and personality that they have now and what they claim to be in the future in relation to their profession. (4) lesson study to improve teacher competency. Lesson study is a model of teacher professional development

through collaborative and continuous learning assessment based on the principles of collegiality and mutual learning to build learning communities. (5) e-literacy. Efforts to improve teacher competence will be easier with the support of e-literacy. The teacher can get information from the internet then it is processed, analyzed so that new information is created. Utilization of e-literacy can add insight to teachers in the era of industrial revolution 4.0.

For students to have 21st century skills, learning methods and best practices must be adjusted. One of them is by blended learning. Blended learning is a way to integrate the use of technology in learning that allows appropriate learning for each student in the class. Blended learning enables reflection on learning (Wibawa, 2018).

The era of the industrial revolution 4.0 will not replace the role of the teacher. Current technology cannot be a facilitator, motivator, inspirator, mentor, imagination developer, creativity, character values, team work and social empathy. Technology cannot replace the role of the teacher as forming the character of students. Nevertheless teachers must continue to develop their competencies so that problems are related to the quality of education.

The future identity of students as moral agents, responsible citizens, and lifelong learners depends on their teachers who balance wisely between traditional and contemporary approaches to guide their learning (Greenlaw, 2015).

How to improve teacher competence is the responsibility and requires commitment from various parties. It is not only teachers who are required to increase their competence. The government needs to overhaul curriculum tailored to the needs of the industrial era 4.0 and encourage teachers to develop themselves. Teachers' perspectives also need to be prepared to develop a digital age curriculum.

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III. CONCLUSION

The era of the industrial revolution 4.0 had an impact on all aspects of life including in the world of education. Teachers are required to have high competence to deal with technological developments. Teacher competency improvement starts from improving the teacher recruitment system. Then the pattern of increasing teacher competency is

bottom up to capture various learning problems in various regions. Continuing professional improvement programs and lesson study are also optimized by utilizing e-literacy as a means for teachers to broaden their insights and knowledge. The benefit is that the teacher can create a variety of learning innovations.

The role of teachers in the era of the industrial revolution 4.0 is irreplaceable by technological advancements. The teacher is forming the character of students through character education, tolerance and the value of kindness. Nevertheless, teachers need to change the way of teaching to be more fun and interesting. The teacher's role shifts from the conveyor of knowledge to the facilitator, motivator, team work and social empathy. If the teacher does not want to increase his competence, the teacher's role can be replaced by technology.

Teacher competency enhancement in the era of the industrial revolution 4.0 is needed so that teachers have: 1) educational competence. 2) competence for technological commercialization, 3) competence in globalization, a world without insulation, not stuttering about various cultures, hybrid competence and problem solver competence. 4) competence in future strategies, the world is easy to change and runs fast so that it has the competence to predict exactly what will happen in the future following its strategy. 5) competence counselor.

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