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Society 5.0: Is It High-Order Thinking?

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Abstract. Nowadays, the evolution of technology develops very quickly so that there is a challenge to be faced by the society. This evolution is due to the era of Industry 4.0 which the development of Information and Communication Technology (ICT) developed rapidly in this era. In the era of Industry 4.0, people are easy to get information quickly, innovation in the field of industrial technology is growing rapidly, and the emergence of Artificial Intelligence (AI) so that it causes changes to people in different countries. In 2016, to anticipate these changes Japan presented an idea namely society 5.0 or better known as a "Super Smart Society". In fact, society 5.0 is not easy, some must be prepared one of them is to prepare students in education. In the educational world, to realize society 5.0, students must have three high abilities namely: problem-solving skills, critical thinking, and creativity. These three abilities are obtained through high-order thinking. This article reviewed some researches which focus on society 5.0 and the high-order thinking skills. This article aims to describe a high-order thinking ability to prepare students toward society 5.0.

Keywords: society 5.0, high-order thinking

INTRODUCTION ~ The development of technology is developing very fast. This development was caused by the industrial revolution 4.0 so that in anticipating problems that would arise in the future an idea, namely about society 5.0. Society 5.0 or better known as super smart society who are able to provide specific solutions through the use of new technologies such as Artificial Intelligence (AI), the use of Big Data, the use of Robots, and the use of drones as well as through policy and regulatory reform (Abe, 2016). The aim of society 5.0 is to create a society that drives financial progress so that the difficulties faced by the society can be minimized, and where individuals can enjoy a very dynamic and pleasant life (Őnday, 2018). The point is that society 5.0 is able to provide or obtain the most suitable solutions to meet the needs of every individual quickly. To realize the society 5.0 or known as "super smart society", the society must be accustomed to think critically, think creatively, and be able to solve problems faced by each individual (Anjani, 2019). These three abilities can be trained by higher-order thinking. Higher-order thinking requires students to manipulate information and ideas in ways that change their meaning and implications (another, 2012).This transformation occurs when students combine facts and ideas to synthesize, generalize, explain, make hypotheses or arrive at conclusions or interpretations. Manipulating information and ideas through this process allows students to solve problems and find new meaning and understanding (for them). In helping students become producers of knowledge, the main instructional task of the teacher is to create activities or environments that enable them to engage in higher-level thinking.

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METHOD

The method used in this study is literature riview method. By literature review method, the author collect relevant data or information about society 5.0, and higher order thinking. All relevant data or information from the written documents such as journals, books and news.Study Literatureis divided into two, namely primary sources (primary sources) and secondary sources (secondary sources). Primary sources are original essays written by someone who sees, fixes, or does himself. Literature material of this kind can consist of diaries (autobiographies), theses, dissertations, research reports, and interview results. Besides primary sources can be in the form of eye sight reports, statistics and so forth.

RESULTS

The long history of this community can be seen from the history of society development (Harayama, 2017), namely: Society 1.0 This society is known as a group of people who hunt and gather together in harmony with nature, society 2.0 as a forming group based on agricultural cultivation, organizational improvement and nation building, Society 3.0 is a society that promotes industrialization through the Industrial Revolution, enables mass production, and Society 4.0 as an information society that realizes the increase in added value by connecting intangible assets as an information network. Society 5.0 is an information society built on Society 4.0, which aims at a people-centered society that is prosperous. "Society 5.0 achieves a high degree of convergence between virtual space (virtual space) and physical space (real space). In the past information society (Society 4.0), people will access cloud services (databases) in cyberspace through the Internet and search, retrieve, and analyze information or data. In cyberspace, this big data is analyzed with artificial intelligence (AI), and the results of the analysis are fed back to humans in physical space in various forms. The effect of society 4.0 is for humans to gather information through networks and have it then analyzed again by humans by humans (Őnday, 2018). So to meet the challenges that occur in society 4.0 and society 5.0, the society must have the ability to analyze such as critical thinking in solving problems faced, the community must also have the ability to think creatively to be able to compete with other communities, in addition it must have the ability to solve problems well. These three abilities can be obtained by thinking at a high level.

Society 5.0

Society 5.0 is the vision of Japan to anticipate the development of the 4.0 industrial revolution. Shinzo Abe (2016) said that thesociety 5.0 is a super smart society where technologies such as Big Data, the Internet of Things (IoT), artificial intelligence (AI), and robots are integrated into every industry and in all social segments. The 5.0

or super-smart society is positioned as the fifth, after the hunter, agrarian, industrial, information society. Society 5.0 represents communities connected with digital technology that are present in detail with the various needs of the community by providing the goods or services needed for the people who need them, when needed, thus enabling the community to live actively and comfortably through high quality services regardless of age, gender, region, language and so on (Shiroishi, 2018). the use of the internet of things (IoT) in the world of Education IoT has not only changed traditional teaching practices but has also brought about changes in the infrastructure of educational institutions (Mohanapriya, 2016). In Indonesia, there are now many applications that use the internet, one of them is the Teacher's Room. Besides IoT there is also artificial intelligence. Andreas Kaplan and Michael Haenlein define artificial intelligence as "the ability of the system to interpret external data correctly, to learn from that data, and to use that learning to achieve certain goals and tasks through flexible adaptation" (Wikipedia, 2019). This means that this system is included in a program or a machine so that it can do work as done by humans. One of them is robot.

Higher Order Thinking

Higher order thinking in mathematics has goals that must be mastered by students, that is, students are able to make guesses, gather evidence, and build arguments to support the idea (Lewis, 2009). Higher order thinking when viewed from the ability to think it includes critical thinking, problem solving, and reasoning. In Wikipedia (2019) higher order thinking or commonly called higher order thinking skills (HOTS) is an educational reform concept based on taxonomic learning (such as Bloom's taxonomy). The idea is that some types of learning require more cognitive processing than others, but also have more general benefits. According to King, goodson, and Rohani (2013) HOTS is the ability to think that not only requires the ability to remember, but also a higher ability. Some research on HOTS, namely in Georgia Murray (2011) examines the implementation of higher order thinking in mathematics learning in secondary schools. Another research was conducted in Malaysia by Ghasempour, Kashefi, Bakar, and Miri (2012) about thinking at a higher level through problem posing problems in mathematics. In addition, Ramos, Dolipas, and Vilamor (2013) examined the relationship between HOTS and academic performance in student physics, and concluded that the level of HOTS on analysis, comparison, and evaluation significantly influenced the physical performance of male students, while the level of HOTS on analysis, inference , and evaluation significantly affects the physics performance of female students.

Higher Order Thinking ImplementationIn Education.

There are several implications that can be used by the teacher one of them in the Theory intro practice about defining higher order thinking (Lewies, 1993), namely: 1) effective learning in higher order thinking becomes very important because in making a decision when a situation is very confusing. 2) depends on the intellectual history of students. 3) students are given a situation or problem that cannot be answered using only simple information. 4) Teaching basic and higher-order skills can be closely interwoven in the classroom. 5) Helping students with learning difficulties to develop skills and higher order thinking is very important.In addition, research on higher order thinking skills has been thoroughly examined, namely by Mahindra (2019) about higher order thinking skills which gives the conclusion that in learning in class the teacher must understand the level that must be measured in the measurement of higher order thinking, besides that the teacher must be able to make higher order thinking skills good. On the other hand,research byTanujaya (2016) about the Development of an Instrument to Measure Higher Order Thinking Skills in Senior High School Mathematics Instruction get the results that from a two-class study of 9 factors higher order thinking the average yield variance reaches 80% so that it follows The researcher used the instrument very well to improve higher order thinking skills.

DISCUSSION

The result of study literature found some relationships between the 5.0 community with higher order thinking. In the era of community education 5.0 uses emerging technologies, namely the use of the internet, software, and the use of robots. There are several abilities that must be possessed by students in preparing themselves in the era of society 5.0 namely students must have the ability to think critically, think creatively, and have good problem-solving abilities. These abilities are higher order thinking skills. In addition to having this ability students must also be able to master soft skills in the use of technology. As research by Rubin and Rajakaruma (2015) on Teaching and Assessing Higher Order Thinking in the Mathematics Classroom with Clickers in this study utilizing clickers technology because the software used is able to provide formative assessments. This study aims to explore the potential of using clickers to teach the process of reasoning of higher-level thinking on broad problems in mathematics classes. In addition, research that examines extensively is Goos (2010) research on Using technology to support effective mathematics teaching and learning: What counts ?. In Goos's research the 3 parts discussed are about teaching and learning mathematics with digital technology, the use of technology in creative ways to enrich mathematics learning, and the application of technology seen from the curriculum. The world of internet of think (IoT) is interesting to be applied in Education. One of them is

Polly and Ausband (2009) research on Developing Higher-Order Thinking Skills through WebQuests which this research explains about the extent to which higher order thinking skills (HOTS) and technology implementation levels (LoTI) occur in WebQuests designed by participants. In addition,research byAnggraena (2019) on The Development of Mathematics Curriculum to Increase the Higher Order Thinking Skills in thesociety 5.0 Era discusses the development of a mathematics curriculum to improve higher-order thinking skills in the 21st century.

CONCLUSION

To prepare for and face the era of society 5.0 namely students must have the ability to think critically, think creatively, and have good problem-solving skills. These abilities are contained in higher order thinking skills. Higher order thinking skills are one of the important competencies in the era of society 5.0. So it can be concluded that higher order thinking is an ability that must be possessed by all people, especially students.

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