

Development of Critical Thinking Skills Through the Citizenship Education Course in the Era of Industrial Revolution 4.0

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Abstract — Critical thinking ability is one of the competencies that must be possessed by students. Critical thinking is an intellectual skill of one character that has become an issue in education in facing industrial revolution 4.0. This study aims at describing the development of students' critical thinking ability in learning Civic Education. The method of this research is descriptive-analytical with a qualitative approach. The results show that the development of critical thinking ability through Civic Education learning in the era of industrial revolution 4.0 brings better results on students' critical thinking. This shows that it has developed on the aspects of knowledge, political, law, moral values, education characters, and citizenship identity so that as young citizens have earned a result in developing a critical thinking ability. This study is expected to be able to describe critical thinking, civic education learning and industrial revolution 4.0.

Keywords: *development of critical thinking skills, Civic Education learning, industrial revolution 4.0*

I. INTRODUCTION

The industrial revolution has changed the way of life and work, and the way people interact in the real world in dealing with one another. A German economist, Klaus Martin Schwab in his book, "The Fourth Industrial Revolution" said that the way also caused changes that become a sign of human labor have been replaced by technological and mechanical sophistication[1]. In the era of industrial revolution 4.0 where information has become the basis in human life, it is marked by (1) information that is available anywhere and can be accessed anytime, (2) faster computing, (3) automation that replaces routine jobs, (4) communication that can be done from anywhere. Everything becomes infinite due to the development of the internet and digital technology and machine. This era influence a better life aspect of economics, politics, culture and education[2][3], so it is necessary to prepare qualified graduates and able to compete globally and master the technological development[4]. That is why, it is important for the role and support of education in enhancing the competitiveness at the national and international level on the

education's increase must be through a method or ways in learning process. Facing the learning in the era of industrial 4.0, an individual must have critical thinking skill, knowledge, and digital literacy abilities, information literacy, media literacy, and master the information and communication technology.

The learning needs guidance from the teacher or lecturer as well as superior as an agent of change which can change the way they learn to think more critically and character in facing a challenge for education practitioners.

University as a creator of the intellectual generation must be able to think and literate critically[5][6]. There are many things must be changed by countries that want to advance. This also applies to Indonesia which is currently facing the era of industrial revolution 4.0 with a level of intense competition. From a number of changes that must be made, human resources improvement as education practitioners to develop critical thinking becomes one thing that must get attention. One of the improvements can be made by applying a learning model[7][8][9]. Critical thinking as an element of intelligent national character must be developed in the world of schooling to universities. More innovative demands in the learning process and the hope that the development of critical thinking is considered in the field of study or courses. The concern about the development of critical thinking was stated by Sanusi (1998) who saw the dominant low-level thinking training especially in his discussion of the perspective of Social Sciences Education. The tendency of lack of awareness among educators in teaching the students about the condition of the world that is growing rapidly which demands a response with critical thinking [10].

Education is an effort to develop the potential of students, both in the form of physical, sense, and initiative so that the potential becomes real and can have function for life. Education also has a central position in developing the potential of students to be an individual who believes God Almighty, noble, healthy and knowledgeable, capable,

creative, independent, and become democratic and responsible citizens[11][12]. At least, there are three things need to be changed from the education side. First, and the most fundamental is to change the nature and mindset of Indonesia young generation today. Second, it is the importance of the schools and universities role in honing and developing the talents of the next generation. Third, the development of the ability of higher education institutions to change the learning model that fits their current needs[13].

The presence of Civic Education subject in the current era of industrial revolution 4.0 must be interpreted as an expected way to be able to deliver the Indonesian to create democracy, good governance, rule of law and civil society relevant to global demands. Of course, these expectations must be accompanied by concrete actions from the nation, especially the universities to appreciate and implement civic education in the world of education. Thus, civic education learning outcomes are very important for the growth of a democratic culture in Indonesia[14][15]. Civic education is developed as the main objective of the education system and needed in all levels of schools that apply learning with high quality and quantity by using an interdisciplinary approach, and interactive learning methods[16][17].

Civic education is targeted at the needs of students who should not be given too many abstract things, but concrete things and useful for daily life. Civic education is a basic subject designed to prepare young citizens to be able to play an active role in society after they are adults. In the 1945 constitution of the Republic of Indonesia as one of the pillars of nationality, especially in the fourth paragraph of the Preamble of the 1945 constitution, there is one of the national goals of the Indonesian nation, which is the intellectual life of the nation. Therefore, the critical thinking skill is an important element for the formation of national character which is very appropriate to be developed through civic education, because one of the components in civic education is civic skills which include intellectual skills.

II. THEORETICAL REVIEW

The critical thinking is a process of reaching belief testing into a form of knowledge as a support to conclude[18][19]. The development of critical thinking ability to master various alternatives in making conclusions and decisions as a key action that needs to be mastered in various context, experiences, and information[20]. Hierarchically, these skills can be detailed as follows: (1) distinguish between facts and values of an opinion, (2) determine the sources reliability, (3) determine the accuracy of the facts of a statement, (4) distinguish the relevant information from the irrelevant, (5) detect irregularities, (6) identify the unstated assumptions, (7) identify the unclear or vague arguments guidelines, (8) recognize the wrong and inconsistent actions, (9) distinguish between unclear or vague opinions, (8) recognize the wrong and inconsistent actions, (9) distinguish between opinions that can and cannot be justified, (10) determine the strength of arguments[21].

Thus, the challenge for the young generation to technology and information needs sensitivity and literacy in

processing information as a form of critical thinking.

Therefore, the learning of civic education needs to be accommodated so that the students can compete in international level in the era of industrial revolution 4.0. The learning of civic education is referred through Project Citizen Model. Project Citizen as instructional treatment that can develop the students' critical thinking ability. Project Citizen Model is also able to prepare young generation to face the era of industrial revolution 4.0 for example like developing critical thinking ability that encourages the desire to act in public interest, nation and country based on faced self-condition and environment[22][23]. Beside solving problems in contemporary times, the critical thinking ability also able to build productivity and creativity at the level of needed critical thinking skills. By implementing the learning of civic education based problem, identifying problems and problem solving processes in teaching and learning also build students' critical thinking such as content thinking, critical thinking and creative thinking so it is found something new[24][25][26]. The Project Citizen learning provides steps for the importance of learning through experience, so the experience can help students develop knowledge, skills, and capability (civic knowledge, civic skill and civic disposition), so it can hone the students' critical thinking in interacting with the community and government[27]. Project Citizen learning model is not just a ceremonial but create the students in establishing future democratic involvement to be more interactive in understanding the nation's problem. Project Citizen is also a learning model that can provide positive stimulation for the students' thinking in thinking critically about the learning content[28][29].

The challenge is also faced to industrial revolution 4.0 comprehensive transformation of all aspects through the merger or digital technology and internet with conventional industry[30]. There are many opinions from various literatures about potential benefits of industry 4.0 in terms of production mobility, economic growth, and customer service. The implementation of industry 4.0 provides positive targets for a country's income. However, it also has challenge as citizens' attitudes or characters. The challenges in the industrial revolution 4.0 emerge changes from social aspect, technological misuse, inaccurate information, politics, and limited human resources[31]. The aspects of industry 4.0 has 14 aspects which are still under development as in the following table 1[32].

Tabel 1: Industry 4.0 Aspects (Hoedi & Wahyudi, 2018)

No	Aspects	Descriptions
1	Standardization	Includes all efforts to arrange standards and references in the implementation of industry 4.0.
2	Modeling	Includes the efforts to model complex system in the industry.
3	Communication Network	Availability of hardware and software technology for fast and real-time of information and data exchange.
4	Safety and security	Everything related to the security of data processing system and the use of technology for human.
5	Human Resources	Includes efforts to transform human resources to be ready to face changes due to industry 4.0.

6	Law	Included efforts to draw up a legal framework in the implementation of industry 4.0 (contracts, agreements, rules, etc).
7	Resource Efficiency	Includes all efforts to improve resource efficiency (energy, costs, etc.) due to the implementation of industry 4.0 technology.
8	CPS Technology	All efforts related to the development of CPN technology, IoT, virtualization which become the key of industry 4.0 technology.
9	Smart factory	Includes the development of automatic, smart, modular and adaptive manufacturing/production systems.
10	Business	Includes the discovery of new business models or changes in business processes due to the application of industry 4.0.
11	Work Design	Includes the development and research related to work system changes that will be faced by workers.
12	Services	Included all efforts in processing big data and making application of its utilization.
13	Management and Organization	Related to changes and development of management and organizational models due to the application of industry 4.0.
14	Rekayasa produk end to end	Related to products or services manipulation that have been digitalized during their life cycle (smart products).

To respond the era of industrial revolution 4.0, it needs education and learning that can create a creative, innovative, and competitive generation. Seeing the phenomenon of the industry 4.0 aspect which is always dynamic, the development of human resources, especially critical thinking mindset is very necessary to transform human resources so that they are ready to face the changes due to the industrial revolution 4.0.

III. RESEARCH METHOD

The method used in solving problems that exist in this study used descriptive analytical methods with a qualitative approach. Qualitative research refers to the natural background as a whole that relies on humans as a research tool, conducts inductive analysis, directs research targets on efforts to find basic theories which is descriptive, prioritizes processes rather than results, limits research studies with focus problems, has several criteria for checking the validity of the data, the design of the study is temporary, and the results of the study have been agreed upon by both parties namely researchers and research subjects[33].

The participants in this study were 37 students of the University of Jambi in Civic Education major. The data collection techniques in this study used participatory observation, in-depth interviews, documentation, triangulation and literature studies[34]. While the data analysis techniques used were data reduction, data display, verification and conclusion[35].

IV. RESULT AND DISCUSSION

The results of the study that have been triangulated and reduced from the results of the analysis on the students can be seen from table 2.

Table 2. : The development of Critical Thinking through Civic Education

No	Civic Knowledge	Indicator	Result
1	Political Knowledge	<ul style="list-style-type: none"> - Able to think critically about politics - Political literacy - Able to sort out political structures - Understanding political functions and structures 	<ul style="list-style-type: none"> - Participate in elections - Take an active role in the world of politics - Able to open up to actual political conditions with all the differences
2	Law of knowledge	<ul style="list-style-type: none"> - Legal literacy - Able to apply the law properly and correctly 	<ul style="list-style-type: none"> - Comply with applicable regulations - Comply with rules relating to community interaction, missal: not steal, persecute and extort others
3	Knowledge of values and morals	<ul style="list-style-type: none"> - Able to identify values and morals in society - Able to apply moral values in daily life - Able to think, behave, and behave based on good values 	<ul style="list-style-type: none"> - Have high solidarity with fellow students and other people - Have responsibility for what is done - Have tolerance to everyone
4	Knowledge of character education	<ul style="list-style-type: none"> - Able to identify the values contained in character education - Able to apply the values of character education 	<ul style="list-style-type: none"> - Practice the religious teachings that are adopted according to the stage of development - Understand the weaknesses and strengths of yourself - Comply with social rules that apply in the wider environment - Demonstrate the ability to think 5logically, critically, creatively and innovatively - Demonstrate the ability to learn independently according to their potential
5	Knowledge of citizenship identity	<ul style="list-style-type: none"> - Able to filter global culture - Have a proud attitude to being a citizen - Able to sacrifice for the integrity of the nation and state 	<ul style="list-style-type: none"> - Proud to be an Indonesian citizen - Use and love domestic products - Filter foreign cultures that will enter Indonesia - Participate in maintaining the nation and state through education - Help each other and work together among humans.

The era of the industrial revolution 4.0 is marked by robots, artificial intelligence, learning machine, biotechnology, blockchain, internet of things (IoT), and

driverless vehicles. The industrial revolution 4.0 has fundamentally changed human's life and work. Unlike the previous industrial revolution, this 4th generation of industrial revolution has a wider scale, scope and complexity. The advancement of new technology that integrates the physical, digital and biological worlds has influenced all scientific disciplines, economics, industry, and government[36][37]. The education 4.0 is a general term used by educational theorists to describe various ways to integrate cyber technology both physically and not into learning. The education 4.0 is a phenomenon that responds to the needs of the fourth industrial revolution where humans and machines are aligned to find solutions, solve problems and of course find innovations[38][39].

To face the era of industrial revolution 4.0, education is needed to be able to form a creative, innovative and competitive generation. One of the efforts to overcome this can be achieved by optimizing the use of technology as an educational aid, so that it is expected to produce output that can follow or change the times better[40]. The learning process that tends to prioritize memorization or just finding a correct answer from the problem is time to leave. Learning methods of education in Indonesia must begin to turn to visionary thought processes, including honing the ability of creative, critical and innovative ways of thinking to deal with various technological and scientific developments[41][42]. Basic education to higher education, adjusting the education curriculum with challenges and needs in the current era. A curriculum that opens access for millennial to gain knowledge and training to become competitive and productive workers[43]. The industrial revolution 4.0 and its relation to education, of course, the world of education is the main and central thing to keep up with the flow of this industrial revolution because it will print and produce quality generations that will fill the industrial revolution 4.0. The education in the era of industrial revolution 4.0 was in the form of changes in the way of learning, thinking patterns and how students act in developing creative innovations in various fields.

Based on the results of the study, it was found that the development of students' critical thinking skills needs to be done through the Civic Education subject. There are many benefits obtained by the existence of Civic Education subject, which include: 1) students become individuals who know their rights and obligations as Indonesian citizens, who can be the pioneers of a just, humane and democratic life of the nation and state; 2) students become individuals who think critically about national and international issues, so that students are expected to become agents of change or agents of renewal that encourage planned social and economic change; 3) students become individuals who are tolerant of the culture and customs of all Indonesian ethnic groups, therefore students can become the next generation of nations that have a high tolerance for different customs and cultures; 4) students can become peace-loving individuals, so that the objectives of Pancasila democracy in Indonesia can be achieved; 5) students can become figures who know and participate in local, national and international political life[44].

The ability to think critically is very important to be successful in life in the era of industrial revolution 4.0. This is understandable because of the complexity of the problems of human life today both in personal life, as well as in the life of the community, nation and state, causing critical thinking skills needed by individuals to be able to answer the challenges that are also becoming increasingly complex too[45]. Only individuals who can use their thinking power critically and creatively can find alternatives for solving these problems.

Schools and colleges are the most appropriate educational institutions in teaching critical thinking skills to students or students. Schools and colleges are not only responsible for helping students to survive in their lives, but also because today's global world students cannot only obtain information but also ways of thinking and several moral characteristics such as open mindedness, anticipation of complexity, resistance to stereotyping, inclination to empathize, non-chauvinism, tolerance and sense of justice[46]. Thus, education must also respond to these conditions by training and providing opportunities for students or students to be able to use and develop their thinking skills to the maximum extent possible. Therefore critical thinking is also an important issue in education.

Civic Education as one of the fields of study that aims to educate citizens to become active and participatory citizens certainly needs to train students to think at a higher level[47]. The ability to think critically should be a priority for this field of study, because of its application of the material in this field of study is more trapping or unclear when compared to those in mathematics or natural science[48][49]. This is because the concepts that exist in social science in general cannot be defined by default, the relationship between concepts is generally not causal but rather correlational[48]. Therefore through the Civic Education course the development of critical and creative thinking, students will be able to explore topics in Civic Education such as human rights, democracy and cultural diversity more deeply[50][51]. By looking at the problem from various perspectives, giving the possibility of a better understanding and opening up opportunities for the emergence of thinking about solutions to existing problems. Thus the critical and creative thinking framework is the right frame of mind developed through the Civic Education course.

The critical thinking skills taught to students is not an easy job, but not at all. Students are members of a community and also members of social groups. Students are influenced by their social environment and have rights and obligations there, so they experience the process of socializing about life together. Therefore universities can improve students' thinking skills to higher memory through well-planned teaching and learning processes. Critical thinking skills are defined by various experts. Defines critical thinking as the reasonable going about deciding what to believe and do[52]. With the word in critical thinking means being able to use the right mind in deciding what will be accepted or believed and what will be done or done.

Critical thinking ability is a complex and active thinking process, which is broader and explores more in a

problem[53][54]. When associated with the objectives of Civic Education, critical thinking is an important thing to achieve that goal. Citizens need to have the ability to distinguish between substantial demands about something with those who are not, able to assess the accuracy of the information they receive, be able to determine the truth level of a statement, be able to separate information that is relevant to those who do not, or know the subjective elements in a statement[55].

To develop the students' critical thinking skills can be done in some steps according to their development. Teaching skills in an integrated manner with the subject matter to be delivered proves to be more effective than being taught separately[47]. Therefore, educators must design learning activities in such a way that students can be actively involved in activities that stimulate them to be able to think critically and creatively. For this reason, choosing the right teaching strategy is a must in developing students' critical thinking skills. Integrating the ability to think critically in the classroom can be done through three stages, namely: 1) incorporating in the lesson plan under the expected goals; 2) give examples by practicing how to think critically right in the classroom, and 3) designing activities that will involve students / students in using their thinking skills.

V. CONCLUSION

The development of critical thinking in the learning of civic education in the era of industrial revolution 4.0 brings more results on students' critical thinking. The learning is implicitly able to develop the students' critical thinking on aspects of politics, law, values, morals, and character and improve the information characteristics, distinguish rational and emotional claims, the ability to show data analysis, the ability to argue, and the ability to use evidence.

The development of critical thinking through civic education learning can bring students to compete in international level. Therefore, through the steps, it is better to be preceded by providing an understanding of the elements of critical thinking and thinking in general, scientific thinking, levels of thinking and thinking models because it is proven by doing so the obtained results will be more maximal.

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