

Transition Challenges From 4.0 To 5.0 Era: A Systematic Review On Education Perspective

Ni Made Anggi Arlina Putri¹

¹IAHN-TP Palangka Raya

¹nimadeanggi@gmail.com

ABSTRACT

The rapid growth of science and technology impact on all human lines including educational. The revolution era 4.0 is considered as a time of technology empower all aspects of society in which degreed humanists. The new society concept is born in order to balancing the application of technology in daily life without reducing human role. However, the new paradigm always brings its obstacles. For example, in education field, the teaching learning process faced several challenging than the previous one. Therefore, this study aims to determine the transition challenges from revolution era 4.0 to Society 5.0 viewed from educational perspective. The systematic review approach is adopted in order to describing the educational challenges due to that transition. The findings suggest to strengthen the conceptual theories and also become the basic of application education 5.0 era.

Keywords: transition era, society 5.0, challenge, Indonesian education

I. Introduction

Globalization era has been entered to Indonesia in 2020 as starting the 4.0 era. This era is a long with the outbreak of Covid-19. it requires people to do physical distancing including education which shift the Indonesian education through online learning. Online learning uses the internet as the main connection between teachers and students at all levels of education during teaching learning process (I, 2018). The development of globalization in Indonesia has more or less changed the role of teachers (Yus Mochamad Cholily, Windy Tunas Putri, 2019). The 4.0 era is considered by integrating of the internet of things in all aspects of citizen. Internet of things (IoT) is used in all aspects of life changes the way of Indonesian people including in education sector. In facing the era, educators must develop curriculum based on 21st century skill including 1) Critical thinking; 2) Creativity and innovation; 3) Interpersonal skills and communication; 4) Teamwork and collaboration; 5) Confident (Yusnaini, 2019). Education in 4.0 era

requires the teachers to have strong core competence namely educational competence, competence in research, competence for digital, competence in globalization (S, 2018). Moreover, the teachers also require to emphasize learning process on the application of hard and soft skill.

Technological developments have changed all human lines, including the education field. For example, the student admission system has changed to online and the learning system has become blended/hybrid learning (Al-Qdah & Ababneh, 2017; Nastiti & Ni'mal'Abdu, 2020; Sujarwo, Sukmawati, Akhiruddin, A., Ridwan, & Suharti, 2020; Hikmat, 2022). This indicates that education Indonesia has entered the 4.0 era. The 21st century is starting point of rapidly developing technology. It can be seen by the integration of technology in all sectors (internet of things). This era is also called disruption era in which all the communication uses social media as a tool (Rahmawati, Ruslan & Bandarsyah, 2021). It signs that community place online interaction and communication as a core need of social being. In the field of education, the revolution 4.0 era requires students to have soft and hard skills according to the needs of the 21st century, namely 6C which covers communication, collaboration, critical thinking, citizenship, creative and character (Rahmawati, Ruslan, & Bandarsyah, 2021). This perspective is also supported by other work by Risdianto (2019) which suggested that students are required 4Cs namely creativity, critical thinking, communication, and collaboration. In with the finding, in facing the revolution era 4.0 especially for education field, graduates must have both soft and hard of 21st century skills including critical thinking, creativity and innovation interpersonal skill and communication, team work and collaboration and also confident (Yusnaini & Slamet, 2019).

However, generally, the implementation of 4.0 era in Indonesia is not completely effective. Literature reports that most of citizen in Indonesia did not have any digital literacy (Setiawan & Lenawati, 2020; S, 2018). The rapid development of science and technology in 4.0 era is without having any control either in social control, political control, or in moral control. Experts report that changing paradigm of industrial revolution 4.0 effects the degradation of human role for example, all the activities have been replaced by machine (Nastiti &

Ni'mal'Abdu, 2020; Darmaji, Mustiningsih, & Arifin, 2019). Nevertheless, in education, the teaching-learning process cannot be completely replaced by machine. Thus, Indonesian teachers have to improve their personal skill including educational competence, research skill, digital literacy, and also 21st century skill (Nastiti & Ni'mal'Abdu, 2020).

Remanding of humanities, the new concept of society is coming out namely society 5.0. This new concept propose the balancing implementation of technology and manner (Kumorotomo, 2020; Holroyd, 2022). This new approach is suggested by Japanese government that aim to remain us using technology wisely based on specific wisdom on human aspect in order to having meaningful life. The era 5.0 provides the new life concept which is expected to make life more comfortable. In contrast to the 4.0 era, the era of Society 5.0 can be interpreted as technology-based human centered of society. This period is human-centered and technology-based in which considered to be able to eliminate social inequalities in society and improve people's lives (Nastiti & Ni'mal'Abdu, 2020). In educational perspective, it means that the use technology does not change the role of teachers in teaching process of transferring knowledge, character and as role models for students. Society 5.0 becomes a new concept of life in which expected to be more comfortable for humans in the community. Yet, the existing of new concept also bring some challenges to citizen especially in developing countries for example, Indonesia. Therefore, this study tries to explore the challenges bringing by Society 5.0 in Education field.

II. Theoretical Framework

a. Industry 4.0

The industrial revolution 4.0 is a period where science and technology grow fastest and cannot be separated from human life. This era is considered by the development of the internet of things in all aspects of citizen. One of them is in the field of education. Along with the development of science and technology, the way of teaching and learning also changes. In the industrial revolution 4.0, learning can be done in online mode or hybrid/blended learning mode through LMS or other social media (Nastiti & Ni'mal'Abdu, 2020; Sujarwo, Sukmawati, Akhiruddin, A.,

Ridwan, & Suharti, 2020; Hikmat, 2022). This new perspective is expected to bring great benefit in society. Therefore, students are also required to have case-based critical thinking skills. On other hands, digital lifestyle and learning by research are needed in 21st century learning process (Trilling & Fadel, 2009). This is very important because it can improve problem solving skills in real life. This requires teachers who have core skills including educational competence, research skills, digital skills, and other 21st century skills. This is what requires teachers to continue to improve their quality and innovate. Instead of effective implementation, in Indonesia, there are majority of society do not have digital literacy facing the 4.0 era (Setiawan & Lenawati, 2020). Moreover, the disruption era also decreases the humanities in applying science technology in daily activities.

b. Society 5.0

Society 5.0 is a new concept proposed by Japanese Government in order to wisely in using technological advancement and manageable life. Based on Kumorotomo (2020) and Holroyd (2022), this new concept offers balancing implementation and consider to humanities. It generally stated that 5.0 era is a period that integration of technology such as internet by things, artificial intelligent in human line due to better life. Facing the new trend of society 5.0 has an indirect impact on Indonesia. Stake holders must be able to adapt in facing this era. The new concept will definitely bring its own challenges for Indonesian education, especially as a developing country. This new paradigm brings a solution of 4.0 era problems for examples, Artificial Intelligence (AI), Big Data, and, Internet of Things (IoT) (Hikmat, 2022). It provides an era that everything can be mobilized and linked through big data technology collected by the internet of things (IoT) into Artificial Intelligence (Hayashi, 2017) as an effort to overcome social problems.

In this new era, it is centered on humanities and digital society in order to fill the gap between economic and social fields. In contrast to the 4.0 era, the era of Society 5.0 can be interpreted as technology-based human centered of society. Society 5.0 becomes a new concept of life in which expected to be more comfortable for humans in the community. People in 5.0 era require better life standard of community (Fukuda, 2020). Therefore, graduates are required to have

21st century skills namely leadership skill, digital literacy, collaboration, problem solving, communication, emotional intelligence, and entrepreneurship (Hikmat, 2022). In educational perspective, it means that the use technology does not change the role of teachers in teaching process of transferring knowledge, character and as role models for students (Falaq, 2020). Moreover, in 5.0 era, AI supports human work as a solution to the problems created during the industrial revolution era 4.0, for example reducing socialization between communities, employment, and other internalization impacts (Faruqi, 2019; Hayashi, 2017). In society 5.0, technology is expected to make better life of citizen. In education field, for example, the learning process can be done beyond boundaries anywhere anytime without replacing the educators' role

III. Methodology

The study aims to exploring obstacles of upcoming 5.0 era paradigm on educational line. The literature review approach is adopted in this work. Library research is a research method that review relevant works in order to give relevant description about the result to the readers (Rondiyah, et al., 2017; Sugiono, 2010). The author seeks literatures from several resources that considered in line with the research question. Sugiono (2019) suggests that this research needs data from literatures namely book, encyclopedias, journal, articles, etc. Therefore, the author collects the data using data collecting technique from scholar Google using Industry 4.0, Society 5.0, education, as key word. The data are analyzed using content analysis to get important insight to the present study. The data instrument is table to classified the literature based on the research objective.

IV. Result and Discussion

A shifting paradigm always follows with several challenges, especially for Indonesia. Firstly, the author tries to identify the data to get reliable information. The detail information can be seen in table 1 below.

Table 1. Characteristic of Society 5.0

Era	Innovation	Articles
5.0	- Internet of things	Darmaji, Mustiningsih, & Arifin, 2019

	<ul style="list-style-type: none">- Big Data- Robot- Sophisticated Machine	
5.0	<ul style="list-style-type: none">- Internet of things- Big Data- Artificial Intelligence	Setiawan & Lenawati, 2020
5.0	<ul style="list-style-type: none">- Internet of things- Artificial Intelligence- Big Data- Robot	Hikmat, 2022

From the data above we know that society 5.0 has several characteristics namely Internet of things, Artificial Intelligence, Big Data, and Sophisticated Machine/ Robot. Based on the literatures, the era of 5.0 is suggested to propose a better life in which expected to be more comfortable for humans in the society, and offers balancing implementation of advances science and technology in human life to be more humanities (Fukuda, 2022; Kumorotomo, 2020, and Holroyd, 2022. It can generally state that in society 5.0, the use of advanced technology in human line does not degrees or replace the core role of people. Therefore, in education field especially, instructor have to be able to facing this period by improving their core competence covering digital literacy, technology literacy, and also others 21st century skill. Thus, making collaboration with Sophisticated tool in teaching learning activities is possible done by Indonesian educator due to achieve the learning goals.

Secondly, identifying the needed skill in each era is important to do in order to know the learning goal of our graduates. Here are some skill that are required in revolution industry 4.0 era as showed in table 2 below.

Table 2. Requiring Skill in Industry 4.0

Era	Skill	Literatures
4.0	<ul style="list-style-type: none">• Digital Literacy• Technology Literacy• Human Literacy	Darmaji, Mustiningsih, & Arifin, 2019
4.0	<ul style="list-style-type: none">• Problem solving• Cooperation with others• Management of people• Critical thinking• Negotiation• Quality control• Service orientation	Trilling, B & Fadel, C. 2009.

	<ul style="list-style-type: none">• Assessment and decision making• Listen actively• Creativity	
4.0	<ul style="list-style-type: none">• Creativity• Critical thinking• Communication• Collaboration	Risdianto, 2019
4.0	<ul style="list-style-type: none">• Problem solving• Critical Thinking• Creativity• Management of people• Cooperation with others• Emotional Intelligence• Assessment and Decision making• Service orientation• Negotiation• Cognitive flexibility	Arianto, 2017
4.0	<ul style="list-style-type: none">• Leadership abilities• Digital literacy• Communication skill• Emotional intelligence• Entrepreneurship• Global citizenship• Teamwork• Problem-solving	Hikmat, 2022
4.0	<ul style="list-style-type: none">• Communication• Collaboration• Citizenship• Creativity• Character	Rahmawati, Ruslan, & Bandarsyah, 2021
4.0	<ul style="list-style-type: none">• Critical thinking• Creativity and innovation• Interpersonal skill and communication• Confident and collaboration	Yusnaini, Y., & Slamet, S. (2019).

After doing syntheses of these literatures, it is found that there are some skills whom graduates belong to. For example, in 2009, students are required to have ten skills covering Problem solving, Cooperation with others, Management of people, Critical thinking, Negotiation, Quality control, Service orientation, Assessment and decision making, listen actively, and Creativity due to facing the 4.0 era (Trilling & Fadel, 2009). In line with this belief, Arianto (2017) proposed

ten upgrade required skill in 4.0 namely Problem solving, Critical Thinking, Creativity, Management of people, Cooperation with others, Emotional Intelligence, Assessment and Decision making, Service orientation, Negotiation, and Cognitive flexibility. He replaces two category skills for example quality control and listen actively become emotional intelligence and cognitive flexibility. Recently, the skills become more specific into 6C and 4Cs. As stated by Rahmawati et al. (2021), 21st century skills that students must have belong to: Communication, Collaboration Citizenship Creativity, and Character. Another theory is offered by Hikmat in 2022 related 4.0 skills namely 4Cs including creativity, critical thinking, communication, and cooperation.

Table 3. Requiring Skill in Industry 5.0

Era	Skill	Literatures
5.0	<ul style="list-style-type: none">• Leadership• Language skill• IT Literacy• Writing skill	Darmaji, Mustiningsih, & Arifin, 2019
5.0	<ul style="list-style-type: none">• Data Literacy• Technological Literacy• Human Literacy	Hikmat, 2022

Based on the data collected, it is found that there are some competences that must be had by graduates in society 5.0 to the new period especially in education aspect as follow:

As suggested by Darmaji et al. (2019) there are four skills need to have by graduartes due to facing the new concept of life such as leadership, language skill, IT literacy, and writing skill. In short, it can be said that leadership competence in which students should have leadership skills that allow them to be independent of technological developments and the advancement of information, of strong character, not dissolving in the torrent of progress that is difficult to slow down, but able to function into the existing development time. Being able to grasp the development trend of every moment, the technology continues to develop.

Moreover, language skills and foreign language skills have become important assets for students to master. In the ages, all these are out of reach. Mastering foreign languages has become an inevitable requirement to be able to play a role in the ability of scientific and technological informatization. Mastering foreign languages allows students to interpret any trend of development. To be a discipline, not just to be the object of technological trends.

IT literacy and IT development are the characteristics of 5.0 people. Students should improve their skills by reading and studying each such rapid development of science and technology. The last is writing skill. An important skill, ability and skill for students to acquire is writing skills which allow students to contribute by bringing ideas, ideas in the age of Society 5.0.

The newest perspective is offered by Hikmat (2022) related to the three competencies preparing students in 5.0 era. They are data literacy, technology literacy, and human literacy. Data literacy is the ability to read, analyze, and use large amounts of data (big data) in a digital world. Technological literacy is understanding how machines work and technical application coding, artificial intelligence, machine learning, engineering principles, biotechnology). Finally, there are humanistic literacy, including humanities, communication and design. As educators in Civilization 5.0, teachers must have digital literacy and creative thinking skills. Therefore, in the era of Society 5.0, educators are expected to be more imaginative in the classroom strength and positivity (Sudibjo et al., 2019); Fajrussalam et al., 2020); Dwiningrum, 2021).

Generally speaking that, In the 5.0 century civilization, educators must be innovative. Digital literacy is one of the needed skills in the era of 5.0. Digital literacy capabilities have impact for both students and lecturers. They have to learn new skills, adjust to new technologies, and deal with global challenges. Each educational institution now needs to create a new educational strategy and literacy. To put it another way, it needs to be supported by the growth of new forms of literacy, particularly data literacy, technology, and human resources. The ability to understand, assess, and use data from a digital environment is referred to as data literacy. It is aimed to preparing the better generation which can use the technology effectively. By having qualified teachers, it also impacts the learning

outcome in which increase the graduate absorption in modern workplace. They must be able to collaborate and utilize IoT and AI such as Google Assistant, educational virtual reality, etc.

V. Closing

The rapid growing of science and technology greatly change citizen paradigm and all human aspect. The industrial revolution 4.0 bring not only positive side but also negative one for example, replacing human element with modern machines in which reduce the humanities in society. The new concept of life called Society 5.0 become a solution in implementing technology wisely. However, this new concept also brings challenges for Indonesian, especially in education. The challenges facing by educators in this era are their willingness to acquire technical mastery and the low level of literacy they possess. Therefore, there are several suggestions can be offer such as:

- a. provides adequate infrastructure
- b. Self-development
- c. Integrated learning

Bibliography

- Setiawan, D., & Lenawati, M. (2020). Peran dan strategi perguruan tinggi dalam menghadapi era Society 5.0. *Journal of Computer, Information System, & Technology Management*, 3(1), 1-7.
- Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. John Wiley & Sons.
- Holroyd, C. (2022). Technological innovation and building a 'super smart'society: Japan's vision of society 5.0. *Journal of Asian Public Policy*, 15(1), 18-31.
- Kumorotomo, W. (2020). Envisioning agile government: Learning from the Japanese concept of society 5.0 and the challenge of public administration in developing countries. In *Annual Conference of Indonesian Association for Public Administration (IAPA 2019)* (pp. 144-163). Atlantis Press.
- Nastiti, F. E., & Ni'mal'Abdu, A. R. (2020). Kesiapan pendidikan Indonesia menghadapi era society 5.0. *Jurnal Kajian Teknologi Pendidikan*, 5(1), 61-66.
- Darmaji, D., Mustiningsih, M., & Arifin, I. (2019). Quality Management Education in the Industrial Revolution Era 4.0 and Society 5.0. In *5th International Conference on Education and Technology (ICET 2019)* (pp. 565-570). Atlantis

- Press.
- Setiawan, D., & Lenawati, M. (2020). Peran dan strategi perguruan tinggi dalam menghadapi era Society 5.0. *Journal of Computer, Information System, & Technology Management*, 3(1), 1-7.
- Risdianto, E. (2019). Analisis pendidikan indonesia di era revolusi industri 4.0. Retrieved 04-08- 2022, From <https://www.academia.edu>
- Rahmawati, M., Ruslan, A., & Bandarsyah, D. (2021). The Era of Society 5.0 as the unification of humans and technology: A literature review on materialism and existentialism. *Jurnal Sosiologi Dialektika*, 16(2), 151-162.
- Al-Qdah, M., & Ababneh, I. (2017). Comparing online and paper exams: Performances and perceptions of Saudi students. *International Journal of Information and Education Technology*, 7(2), 106.
- Sujarwo, S., Sukmawati, S., Akhiruddin, A., Ridwan, R., & Suharti Siradjuddin, S. S. (2020). An Analysis of University Students' Perspective On Online Learning in The Midst of Covid-19 Pandemic. *Jurnal Pendidikan Dan Pengajaran*, 53(2), 125. <https://doi.org/10.23887/jpp.v53i2.24964>
- Hikmat, H. (2022). The Readiness of Education in Indonesia in Facing The Society Era 5.0. *Jurnal Basicedu*, 6(2), 2953-2961.
- Yusnaini, Y., & Slamet, S. (2019). Era Revolusi Industri 4.0: Tantangan Dan peluang Dalam Upaya Meningkatkan Literasi Pendidikan. In *Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang* (Vol. 12, No. 01).
- Fukuda, K. (2020). Science, technology and innovation ecosystem transformation toward society 5.0. *International journal of production economics*, 220, 107460.
- Falaq, Y. (2020). Education of Citizenship in Higher Education as A Fortress of Nation Characters in Facing Era Society 5.0. *Journal of Educational Sciences*, 4(4), 802-812.
- Saputra, I. (2018). PENGUATAN KESADARAN BELA NEGARA MELALUI PENDIDIKAN DEMOKRASI DIGITAL DI PERGURUAN TINGGI. In *SEMINAR BELA NEGARA* (p. 35).
- Hayashi, H. S. (2017). International Standardization For Smarter Society In The Field Of Measurement, Control And Automation. 56th Annual Conference Of The Society Of Instrument And Control Eng.
- Yus Mochamad Cholily, Windy Tunas Putri, P. A. K. (2019). PEMBELAJARAN DI ERA REVOLUSI INDUSTRI 4.0. *Seminar Nasional Penelitian Pendidikan Matematika (SNP2M) 2019 Universitas Muhammadiyah Tangerang*, 1-6. Tangerang: FKIP Universitas Muhammadiyah Tangerang.
- Yusnaini, Y. (2019). Era Revolusi Industri 4.0: Tantangan Dan Peluang Dalam Upaya Meningkatkan Literasi Pendidikan. *Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang*. Palembang.
- S, W. (2018). Pendidikan Dalam Era Revolusi Industri 4.0 di Indonesia. Jakarta: PT.

- Gramedia.
- Trilling, B & Fadel, C. 2009. 21st-Century Skills: Learning For Life In Our Times. US: Jossey-Bass A Wiley Imprint.
- Sudibjo, N., Idawati, L., & Harsanti, H. G. R. (2019). Characteristics of Learning in the Era of Industry 4.0 and Society 5.0. *Advances in Social Science, Education and Humanities Research*, 372(1), 276–278.
- Fajrussalam, H., Mansyur, A. S., & Zaqiah, Q. Y. (2020). Gaining Education Character Based on Cultural Sundanese Values: The Innovation of Islamic Education Curriculum in Facing Era Society 5.0. *Jurnal Iqra': Kajian Ilmu Pendidikan*, 5(1), 104–119.
- Dwiningrum, S. I. A. (2021). Strengthening resilience for learning transformation and anticipatory education in the era of society 5.0. *Educational Innovation in Society 5.0 Era: Challenges and Opportunities: Proceedings of the 4th International Conference on Current Issues in Education (ICCIE 2020)*, Yogyakarta, Indonesia, 3-4 October 2020, 11.