Characteristics of Learning in the Era of Industry 4.0 and Society 5.0

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Abstract-*Global developments and its dynamics in the era of Industry 4.0 and Society 5.0 have had an impact on the education sector in Indonesia, especially in the changing characteristics of learning. The purpose of this study is to analyze the characteristics of learning in the era of Industry 4.0 and Society 5.0, specifically in the masters program of education technology of a private university in Jakarta. This study employed a qualitative approach, through the technique of Focus Group Discussion (FGD) to obtain thematic data. There were eleven participants of the FGD representing various groups of stakeholders including the government, study program association, industry/corporations, university administrators/leaders, lecturers, students and alumni. The results of this FGD indicate that learning characteristics in the era of Industry 4.0 and Society 5.0 are rapidly changing and need to be accommodated in the teaching and learning processes in higher education institutions.*

Key Words: industry 4.0, society 5.0, focus group discussion, learning

I. INTRODUCTION

The emergence of Industry 4.0 as a new era characterized by digitalization, information transparency, connectivity and automatism, which was followed by the idea of Society 5.0 as the future of modern society, presents particular challenges to educational institutions. Kasali (in Mukminan, 2015) stated that the challenges faced by Indonesia in the future are, among others, the very rapid change that is tempestuous and full of uncertainties, hyper competition, self-picture civilization, and self-centred learning.

Industry 4.0 is a major change that affects the way people work and do business. The change includes the integration of production facilities, material supply chains and service system that add value to goods or services provided for customers (Salkin, et al., 2018). The biggest change that occurred in the Industry 4.0 is the technology breakthroughs, including nanotechnology, biotechnology, energy storage, quantum computing, artificial intelligence, robotics, internet of things, automatic vehicles, 3D printing, etc. (Schwab, 2016). Meanwhile, Society 5.0 can be defined as smart community where physical world and cyberspace are very integrated (Salgues, 2018). Society 5.0 focuses on humanism by prioritizing the development of scientific and technological innovation that have the main development purpose in economic sector. Salgues (2018) stated that Society 5.0 has the following characteristics: (1) use full information and communication technology; (2) is centred on community; (3) people participation; (4) has common values: sustainability, inclusive, effective, and intelligence power; and (5) development of economic disruption.

Changes brought by the development of Industry 4.0 and Society 5.0 will further affect all aspects of human life. Today's lifestyle is increasingly promoting practicality and efficiency. In terms of fulfilling daily needs, Industry 4.0 and Society 5.0 encourage the emergence of various types of new consumer services, e.g. online transportation, food delivery applications, e-commerce and so on. In terms of type of work, currently, there are several types of new jobs that have emerged such as youtuber, vlogger, copywriter, social media officer, content writer and so on.

Industry 4.0 and Society 5.0 also bring some changes to the education industry. Learning, according to Act No.12 Year 2012 on Higher Education, Chapter 1 verse 12, is the interaction process between a university student and the lecturers and learning sources in a learning environment. The learning process nowadays is influenced by the enormous technological breakthroughs. Learners in the era of Industry 4.0 and Society 5.0 are technology-savvy and almost all of them have access to technology so that they can easily obtain information. Their interest in learning also undergoes change influenced by developments and changes in the type of work. Collins and Halverson (2018) explained that the knowledge in technology era has its own customization, interaction, and control of the user. They added that knowledge in the era of technology emphasizes on the access to allow people pursue their passion and goal, and to provide social learning space that is rich for people to learn what they choose, and able to be the type of person they want.

Changes that occur in education caused by new trends in Industry 4.0 and Society 5.0 must be addressed wisely by educational institutions. Educational institutions must pay serious attention to how the education services provided can answer new challenges caused by the current changes. Educational

institutions must be able to accommodate technological breakthroughs in the era of Industry 4.0 and the new lifestyle of Society 5.0 in the education processes. Therefore, educational institutions need to analyze carefully the characteristics of education in Industry 4.0 and Society 5.0 in order to be able to provide quality, appropriate and well-targeted educational services.

Based on this background, the researchers conducted the study in order to analyze the learning characteristics in the era of Industry 4.0 and Society 5.0.

II.   METHOD

This study employed qualitative approach, through Focus Group Discussion (FGD) technique to obtain thematic data. During the FGD, the three researchers were all involved as the moderator, blocker, and note taker. Data collecting technique in this study was open-ended questions presented by the moderator, observation by the blocker, and recording of the discussion by the note taker that will be analyzed descriptively. In addition, questionnaires were distributed and processed with descriptive statistics.

This study was conducted in April to May 2019. The focus group discussion was held on 24th April 2019 at 15.30-17.30. There were 11 participants of the FGD representing different stakeholders, including the leaders of Universitas Pelita Harapan, lecturers of Master of Education Technology, representatives of Kemendikbud (Ministry of Education and Culture), Kemenristekdikti (Ministry of Research, Technology, and Higher Education), Education Authorities of DKI, Directorate of Online Education of UPH, education technology provider (Microsoft), alumni of UPH Master of Educational Technology, and students of Master of Educational Technology of UPH.

a. Key Findings
1. Learning environment and atmosphere in the digital era: Internet of things, fast-paced, artificial intelligence
2. Learning approach in relation to the role of teachers and students: Student-centered, teacher-directed
3. Learning models in the digital era: Project-based learning and collaborative learning
4. Learning methods in the digital era: Blended/hybrid learning and E-learning

III.   RESULT

The learning environment and atmosphere in the digital age are changing very fast. One of the biggest changes is the use of the internet in life. Almost everybody today uses the internet every day, every time through their own/personal devices. This also applies in learning. Almost all students now use internet to obtain information as well as learning resources. They may use Google, Bing, Google Scholars and others, or learning systems such as Google Classroom, One Note, Moodle, and so on. This encourages student interaction to be fast-paced. Students can get information quickly, exchange information quickly with a variety of social media and communication, work on and collect tasks faster using a learning management system without having to collect or meet their teachers, buy books or other school equipment and pay school fees quickly and easily with virtual accounts, and various other facilities that speed up interaction and educational transactions. All of those can be done because they have access to internet connection.

Another thing that drives change is artificial intelligence. Artificial intelligence is personalized so that it can support the individual needs in learning and teaching. Artificial Intelligence is used to help students in learning, it can even help students who does not understand the learning material, by giving some advices about content or resources that fit their situation. For teachers, artificial intelligence assistance can be used to help them in doing administration such as marking students' work and prepare learning materials. Artificial intelligence is very adaptive and knows our habits. When students use Google or YouTube to search for certain content, artificial intelligence will present recommendations according to our habits before we even ask for it. This of course makes it very easy for students and teachers to get relevant and fast information.

IV.   DISCUSSION

Changes in the atmosphere and learning environment also affect the role of teachers and students in the teaching and learning processes. All participants agreed that learning approach in the digital age should be student-centered. However, the role of the teacher cannot be completely neglected, it is even more important to give students direction and act as facilitator. With this student-centered approach, students will be more active, and the provided learning facilities will strongly support and encourage them to be creative. Information can now be easily obtained, thus teacher is no longer the primary source of information.

The student-centered learning approach also needs specific learning models and methods. Learning models that fit the digital era are project-based learning and collaborative learning. Since learning resources could easily be obtained by students, teaching-learning activities are transformed into productive activities, where students are no longer just listening and discussing materials from the teachers, but also processing the

various information they obtain from various sources into a required work. Project-based learning will encourage a variety of learning outcomes from students' thinking processes.

The learning model that also fits the digital era is collaborative learning, where students collaborate and work together in the learning process or creating learning output such as project. In collaborating, students will carry out a learning process where they share knowledge, learn from and add insight to each other. This is important not only to enrich their knowledge, but also to prepare them for the real work.

Next is the learning method in the digital era. The learning method that is in accordance with the digital era is blended/ hybrid learning and E-learning. Nowadays with the increasingly sophisticated technology, learning do not have to be done only in conventional ways such as face-to-face meetings in a classroom. At present, technology-based distance education must be developed to provide quality education that can be accessed by anyone, at anytime and everywhere. Therefore e-learning and blended learning are the right learning methods to be pursued in today's digital age. In particular, blended learning can facilitate more learning because it can bridge between face-to-face meetings and distance education and can be tailored to fulfill the specific needs. Flexibility and innovation are important keys in providing learning facilities in today's digital era.

V. CONCLUSION

Based on the result of the focus group discussion on the characteristics of learning in the era of Industry 4.0 and Society 5.0, it is concluded that the learning environment and atmosphere in digital era are internet of things, fast-paced, and Artificial Intelligence. The most suitable learning approach applied in the digital era is student-centered, teacher-directed. The learning models that fit digital era are project-based learning and collaborative learning. The learning methods that fit digital era are blended/hybrid learning and E-learning.

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