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The understanding of lecturers about the new literacy in industrial revolution era 4.0: a study case of university of putra indonesia yptk padang

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Abstract. The paper discusses how the understanding of lecturers at University of Putra Indonesia YPTK Padang is related to the new literacy in the Industrial revolution Era 4.0 which is big data literacy, technology literacy, and humanity literacy which have recently been a basis in developing learning in universities and which help to accommodate graduates to be able to compete in the era of globalization. This research is done by qualitative approach, the sample is 35 university of Putra Indonesia lecturers in multi-disciplines. Triangulation is used to collect the data through interview, observation and documentation. Data are analyzed using the procedures proposed by Creswell. The finding explains that the lecturers' understanding of the new literacy in Industrial revolution era 4.0 are generally low; those are in understanding of big data taxonomy analysis, enough understanding and application of technology taxonomy analysis, and has applied humanity literacy only limited to train critical thinking, creativity, collaboration, and communication yet inapplicable and less focus on enhancing competitive skills in the era of globalization. The research suggests the lecturers to do improvement independently and through campus support. They also need to be more applicable in implementing new literacy in the era of industrial revolution 4.0.

1. Introduction

Rapid development which happens in every single of human living due to a result of transformation industrial revolution phenomena brings a real challenge in every levels. The transformation of Industrial revolution has been a hot issue propounded by experts. Industrial revolution 3.0 has been the beginning of the rise of the incoming big waves of industrial revolution 4.0. This shift comes about in a short time due to an impact of the use of artificial intelligence, robotics technology, internet of thing with collaboration of digitalization and automation.

The changing of life setting in globalization era has indirectly influenced the reference and formulas of competency in education curriculum, especially education curriculum in university. Along with the alteration in the current of globalization, education curriculum must conform its goals with the learning process. The role of cultural transformation impact positions universities to stand against the changing of disruption culture which exists in the society. Clifton (2016) states that it is likely to happen that universities will experience a defeat in the graduates quality because what have been taught are not relevant to what the world's need. It means that the university will face an arduous challenge in the industrial 4.0. When universities focus to the theory mastery which has no renewal, since generally known that automation has replaced lots of manual labors, information technology has replaced the clerical work and many others, we need to raise a question of how the preparation of the



lecturers is, as the educators in executing the learning process in universities to prepare the graduates with the ability of new literacy in the era of industrial revolution 4.0.

Since the first proclamation of 21st century framework which formulated in the form of P21 framework (Partnership for 21st Century Framework), the field preliminary observation has been done to lecturers at University of Putra Indonesia, Padang. The observation shows that most of them are still new with the concept of learning P21. It is proved by looking at the learning curriculum used like syllabus, teaching material, and methods which are still not referring to the learning of new literacy in the era of industrial revolution 4.0. This situation need to get a serious attention both by the universities and lecturers since it will lead to the learning process in the classroom. This issue has also been a concern to Director General of Higher Education, Dirjen Dikti Belmana. He proposes a policy about a concept of learning P21 with curriculum oriented. The curriculum cannot just train the ability of old literacy like reading, writing and counting but must be supported by the ability of mastery a new literacy like big data, technology and humanity. The lecturer's understanding of this issues is the object of the research that needs to be qualitatively analyzed: study case at university of Putra Indonesia YPTK, Padang.

1.1 New Literacy

Clifton (2016) states it is likely that universities will soon experience a defeat in the quality of the graduates because what have been taught are not relevant to what the world's need. Clifton agrees that the universities, especially the vocational education, face the challenges of difficulties in the industrial era 4.0. As the matter of fact, most universities still focus to the mastery of theory which has no renewal, while automation has replaced most of manual labor, information technology has replaced the clerical work and many others. Then the question is what should vocational universities do in dealing with the challenge in order to succeed preparing the graduates to enter the field of work in accordance with the globalization era job market. Sudlow (2018) in review of newest Robot-Prof books: Higher Education in Joseph E. Aoun states a critical thinking relates to the solution of universities to prepare the future of the students as they enter the workforce, as the shift of workforce demands in technological era. Aoun propounds that new literacy which include: literacy of technological mastery which requires the principle abilities relate to basic techniques of technology, literacy of big data which requires understanding, interpretation, and utilization of big data, and literacy of humanity which requires the demands of social environment, leadership, teamwork, emotional and social maturity and agility.

1.2 Big Data Literacy

The use of internet service in 2017 shows that, from the use of Big data for instance, Facebook in 2002 has owned more than 1 billion users, and handled 350 million photo uploads, 4.5 billion likes, and 10 billion messages a day. All these mean the social media has saved more than 100 petabytes for the analytical need. Lemieux (2014) states that Big data relate to (1) volume, (2) velocity (the speed of data), (3) variety of data. Khan dkk. (2017) explains that big data is the integration of multi-disciplines technology which facilitate the customer with the outstanding services even for one click. Internet as a link through networking system enhances the communicative ability in each devices in order to connect to other devices which can also access the internet. Thus, the presence of Big Data creates new horizons and opportunities to save and get more data. Saving all data is the need of Industrial Revolution 4.0, cloud computing system: Service-oriented Architecture (SOA) and virtualization has changed all of the management and information technology (ICT) paradigm from traditional computing to cloud computing. Storage, computing power, infrastructure, platforms and software are provided as services in the form of Pay-as-you-go on. Infra-structure as a Service (IaaS), (Evan, 2012). Smart machines connect the internal and external industries, facilitate industry and place the capability of communication with sophisticated hardware and software. Big data in the cloud also has challenge in Industry 4.0, specifically for remote controlled physical devices and the internet industry.

1.3 Technology Literacy

Recently, technology has been a formative part of society and an important factor in human life, personally and professionally. Technology gives impacts in economy, environment, culture, health. It ensures sustainable development and becomes a center of innovation in a profession. According to Zinn (2014) Technology responds to fundamental social challenges and provides mobility, communication and innovation. Technology also has changed human habits, lifestyles and work processes which become both blessings and burdens in human life. Besides that, Indisputable technology holds a key position for social change and determines how one and a group of people view themselves and the world. According to Setyawan (2018) Technology literacy is “The ability of a person to work independently and to cooperate with others effectively, full of responsibility and accuracy by using technological instruments to obtain, to manage, then to integrate, to evaluate, to make and to communicate the information.” Technology literacy means a set of abilities a person has to use to manage, to assess, and to understand technology. People who are tech savvy will understand, in an increasingly sophisticated way that develops over time, knowing what is technology, how it is created, how it forms the society and how it is used in human life.

Technology literacy and communication media in the part of the 21st century rainbow skill scheme which is proposed by Triling and Fadel (2009) consist of 1) information literacy: students are able to access information effectively (the source of information) and efficiently (timing); to evaluate information critically and competently; to use and to manage information accurately and effectively to solve problems. 2) Media literacy: students are able to choose and develop the media which is used to communicate. 3) ICT literacy: students are able to analyze information media; to create suitable media for communication. *Ministry of Communication and Information Technology* (2006) states that knowledge or technology literacy is one of the prerequisites for people's readiness to optimize the use of technology for their lives. Such knowledge is needed because it is a form of mental readiness that can give direction for each individual to gain profits through the use of information and communication technology. Theoretically, in order to reach the level of technology literacy, there are four indicators of assessment that must be mastered, 1) information literacy, 2) Digital literacy, 3) Media literacy.

1.4 Humanity Literacy

Sudlow (2018) in Review theory suggested by Aoun relates to new literacy in the Industrial revolution era 4.0 states that in order to succeed in the challenges of the globalization era a future workforce must show a higher order of thought. Critical thinking in the concept of education of the 21st Century is described as “the ability to design and manage project, to handle problems, and to make effective decision by using varies tools and resources. “ (Fullan, 2013). Drake (2014) views that critical thinking is the ability to highlight challenges, design learning experiences to overcome local problems and real-world problems that may not have clear answers. Critical thinking according to Bialik, dkk. (2015) is a form of critical thinking “intellectually as a disciplinary process in active, skilled conceptualization, applying, analyzing, synthesizing, or evaluating information collected from, or produced by, observation, experience, reflection, reason or communication, as a guide to beliefs and actions. According to Greenstein, L. (2012) Teaching critical thinking can be done in various forms, from curricula that train students to identify and practice high-level thinking skills.

Gadner (2007) quotes “minds that create” as one of the thoughts that will be needed in the future, the educational process requires displaying exploration, challenging problems, and tolerance. According to Fullan (2013) “Creativity includes concepts, economic and social entrepreneurship and leadership to act”. Uptis (2014) argues that creativity in schools gives students experience with situations to find many solutions to problems, where tension of ambiguity is valued as fertile ground, and imagination is highly valued.

Although it is currently known that only a few professions are based on communication skills (such as therapists, public speakers, customer service), basically all professions require various forms of communicative activities such as; negotiating, giving instructions, giving advice, building relationships, resolving conflicts, and so on (Hobbs, 2015). Hobbs (2015) also states that collaboration also requires students to develop collective intelligence and to build meaning, to become content

creators and consumers. New skills and knowledge are needed to enable team members to collaborate digitally and to contribute in the collective knowledge bases, whether working remotely or in shared physical space.”

Miller (2000) states that in an increasingly complex world, the best approach to solving diverse problems needs to involve collaboration between people and institutions with different skills and backgrounds. Collaboration allows a group to make better decisions than doing it themselves. Alber (2012) proposed that Collaborative activities are carried out by establishing group agreements and accountability for assigned tasks, determining the stages for division of labor and synergizing in groups as an effort to achieve common goals.

2. Methodology

This research was conducted qualitative approach. Qualitative research is carried out with a naturalistic form based on post positivism philosophy which is used to examine objects with natural conditions. The researchers are the key instrument in this research which data collection techniques with interviews, observation and documentation. The data analysis using triangulation techniques, data reduction and conclusion based on saturated data disclosures that appear during the research. This research was in the UPI YPTK Padang environment, the respondents were 35 lecturers University of Putra Indonesia lectures in multi-disciplines from various faculties. The steps taken in this study based on Creswell's (2014) opinion as stated in the following chart:

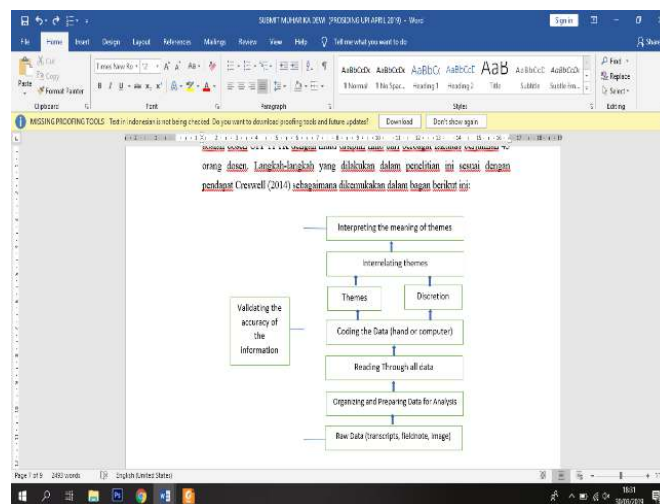


Figure 1. The steps of qualitative data analysis (Creswell, 2014)

3. Finding and Discussion

The research was conducted in the UPI YPTK environment, data obtained through triangulation techniques of data collection methods through interviews, observation and documentation will be elaborated according to the level of analysis, starting from domain analysis, include lecturers' knowledge about the extent of the lecturers' understanding of the new literacy of Industrial Revolution 4.0, which increasing taxonomy analysis on understanding the literacy of big data, technology literacy, humanity literacy. Data analysis is presented as follows:

3.1 General understanding of New Literacy in the Industrial Revolution Era 4.0

The field diary of researchers related to how lecturers understand about the industrial revolution literacy 4.0 states that in general new lecturers hear the term new literacy. Generally, respondents expressed the opinion that they wanted to know more in the study of literacy in the industrial revolution era which is now widely discussed in popular studies of higher education. It is limited of the knowledge expressed by respondents that literacy is related to the ability to read and write only. For this view, almost all respondents stated that they did not understand the term literacy which

consisted of big data literacy, technology literacy and humanity literacy. The results of the study stated that most lecturers did not understand the new study of literacy in the industrial revolution but had high curiosity about it. The interest and intention to understand about it arises because this term affects the chance of grants offered by the government, this is related to the need to carry out the three pillars of higher education that must be carried out by the lecturer. The data obtained means that even though they do not yet understand, but due to the needs related to the demands of educators who must understand technological developments in the era of globalization, the lecturers have the desire to know more about it.

Based on the respondents' information stated that most respondents wanted an increase in knowledge about new literacy, the lecturers gained comprehension through limited number of journals related to new literacy, although there were many journals that suggested 21st century learning in P21 Partner shipments but were still associated with new literacy. The enthusiasm of lecturers in understanding the concept of new literacy of industrial revolution 4.0 is proven by their participation in seminars with the theme of 21st century literacy, although there are not many studies that lead to new content literacy that spells out basic concepts and things that are applicative lecturers can apply in their demands to prepare students to study in the 21st century.

Overall, the respondents showed enthusiasm in a positive outlook to find out more about the new literacy the industrial revolution era 4.0. But in the view of the researcher the important thing faced by respondents is that they as a whole expect assistance from the campus to provide training or a form of container that can given them the opportunity to understand learning based on the new literacy of the industrial revolution era 4.0. This should be overcome by understanding that this knowledge should be obtained by the independent learning of lecturers through discussion, reading and developing their own concepts of knowledge on this concept, although getting knowledge through debriefing and knowledge is not bad but understanding itself will provide more benefits big and wide. The conclusions taken in the main content domain analysis of this study are that most lecturers do not understand the new literacy concept of the industrial revolution era 4.0, the lecturers expect their college facilitation to provide knowledge through training, they lack independence in developing their knowledge, the lecturers want increased ability about this content because it is related to the needs and demands of three pillar of higher education especially in a research.

3.2 Understanding of Big Data Literacy research.

The results of special study on taxonomy analysis in understanding the big data literacy which is part of the new literacy states that some lecturers do not understand about concept of big data. The lecturers do not know the basic meaning and concepts of big data, especially how to apply it in education. Most lecturers view that big data literacy is a new term that is still ambiguous to understand. However, based on the researchers' observations, the lecturers have applied using the big data literacy concept in learning, as evidenced that application of e-learning at the UPI YPTK. Although it has applied e-learning but three big data components are; download, upload and track record of student and lecturer data in the learning process is still not understood. If the lecturer understands the concept correctly, it can be felt that the application of big data literacy is not only beneficial for lecturers and students, but it will also be useful for raising the big name of the campus because through well-organized big data will affect promotion for the college itself. The conclusion of the big data taxonomy analysis states that most lecturers do not understand even though directly some have used big data in learning, but have not been oriented to organized literacy well.

3.3 Understanding of Literacy Technology

The results of taxonomy analysis related to understanding about technological literacy stated that many lecturers understand that have to apply and use technology in learning at 21st century. Although in a deeper concept, the lecturer does not understand that part of technological literacy are information literacy, media literacy and digital literacy. In general, the lecturers assume that technological literacy is only use of technology as a medium.

The lecturers use technology in learning as media, they using digital-based media such as in-focus, laptops, e-learning, students' attendance and give grades accessed through the web for educational

needs. The lecturers still need an understanding of information literacy that is more focused on how information can be obtained data in internet must be processed with critical thinking. The conclusion that can be found an understanding of technological literacy is most lecturers have used technology as limited as media in learning and digitalization literacy, they should increase their understanding of information literacy by combining the application of humanity literacy in critical thinking.

3.4 Understanding of Humanity Literacy

The results of taxonomy data analysis in understanding of humanity literacy are stated that basically the lecturers have comprehension in the application of 4C learning namely Critical Thinking, Creativity, Communication and Collaboration. These learning models recognized by lecturers have often been applied in learning. After further exploration of critical thinking understanding is still not related to the understanding in the era of globalization, the lecturers are less associated with critical thinking habits and competition in the era of globalization. The lecturer admitted that he had applied learning with communication and collaboration through the application of learning with the TCL (teacher center learning) approach. Learning models and learning methods that support creativity have been carried out, even though in concepts that have not been properly directed at competitiveness in the era of globalization. In this taxonomy analysis, it can be concluded that the lecturers already know and have an understanding of humanity literacy, the lecturers have implemented student-based learning methods and models but need to direct activities created in learning by leading learning to learning concepts for preparing students to compete in the era of globalization.

4. Conclusion

The domain analysis in understanding of lecturers at UPI YPTK that responding to a new literacy in the industrial revolution era 4.0 can be explained that most lecturers do not understand the new literacy concept of industrial revolution era 4.0, which they want to increase ability of this content because it related to the needs and demands of their three pillars specifically research. The analysis of taxonomy big data states that most lecturers do not understand about it, even though some lecturers have directly used big data in learning, but they have not been oriented organize literacy well. The analysis of taxonomy in understanding of technological literacy states that most lecturers have used technology in learning as limited as the use of media and digitalization literacy in learning, the lecturers must improve their understanding of information literacy by combining the application of humanity literacy, especially critical thinking. This taxonomy analysis can be concluded that the lecturers already know and understand of humanity literacy, lecturers have applied student-based learning methods and models but need to direct activities created in learning for preparing students to compete in globalization era. The results of qualitative research that has been described above implies that the lecturers must enhance their understanding of the new literacy in the revolutionary era as basis for implementing learning requirements with the orientation of preparing human competition resources in the era of globalization. Through this study, it is recommended to learn more actively about the concept of 21st century learning to improve of quality in learning and education at higher education.

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