E-Learning as Connector among Education Institution in the 4th Industrial Revolution

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E-Learning as Connector among Education Institution in the 4th Industrial Revolution

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Abstract. This paper presents the possibility of e-learning as connector among education institutions in the fourth industrial revolution. Since industry started emerging in this world, the industrial journey has reached level four that is currently well known as the fourth industrial revolution. Each stage of revolution has its own impact on education. The fourth industrial revolution requires educational sector synchronize the educational process in order for students or graduates to smoothly interact to the revolutionized changes. E-learning is one among educational entities that is relevant to the fourth industrial revolution in the area of education. With the connectedness as the main characteristic of the fourth industrial revolution, it gives a wide range of opportunities among education institutions particularly for higher education institutions to work, collaborate, and help each other within the platform of e-learning. Besides that, e-learning also enable the developed higher education to help primary and secondary schools at low cost and energy, particularly for professional development of teacher.

Keywords. E-learning, Higher Education, The 4th Industrial Revolution

1. Introduction

We live today in the era of technological revolution where almost everything has changed when compared to the last century. This era of connectedness is well known as the era of the fourth industrial revolution which is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres [1]. The fast-changing world, particularly in information technology, has changed the way people interact with many things. It has changed much

how the people interact with the world, particularly with the job and education [2], [3], [4]. People might never imagine before with what happen today where dramatic changing appear almost in all aspect of life [1], [5]. For example, only in the last three decades it was impossible for people to learn high quality lessons from prominent professors in a reputable university without leaving their hometown for the countries where the lectures were held. The situation is now quite far different when everyone can engage with a high quality education offered by high reputation universities from every corner of the world. It does not matter where they come from and what campuses or educational bodies provide the lesson as long as they are connected to the internet.

2. The Fourth Industrial Revolution and Higher Education

In term of education, higher education is one of the determining parts on all level of education institutions. For survival and sustainable reason, higher education needs to adapt to this exponential growth of technology. The highereducation should consider fundamental changes of the curriculum to facilitate students to cope with newly emerge subjects such as genomics, big data, artificial intelligence, robotics and nanomaterials, etc. [5].

The higher education need to synchronize academics contents as numerous new opportunities or vacancies in many workplaces where they are not available in the previous periods. For example, the need for data scientists to solve the problem of big data has risen dramatically while the people with these skills are currently very few. Higher education, particularly for those computer sciences and its application, needs to adjust its curriculum and pedagogical approaches to answer this challenge. Otherwise, the university graduates will be left far behind the reality.

Another important effect of industrial revolution today that there are many higher education institutions who have been offering high quality education from a well-accredited university remotely. Students may register and study at a university with friends from every corner of the world without meeting physically but they may learn together as if they were in a common classroom. The interconnectedness among students across the globe in one class is one of the main characteristics of the fourth industrial revolution era.

E-learning can be used both on standalone basis that is a single platform to deliver certain courses totally and it can also be used as blended learning platform that is the combination of face-to-face lectures and e-learning. Most higher education institutions around the world are currently use e-learning as additional part of their conventional classroom learning. [6] stated that like any other things, e-learning also may have its advantages and challenges. The advantages of the use of e-learning are (i) flexible in term of time or place, (ii) enhance the efficacy of knowledge and qualification, (iii) the possibility of continuous interaction through discussion forum, (iv) relatively cheap, (v) accommodate learners difference, (vi) compensate the scarcities of staff, and (vii) allow the self-pacing growth. Along with its advantages, the use of e-learning in education institutions would be different from one place to another and it has many challenges or disadvantages. [7] summarised five main challenges e-learning will face, i.e (i) learning styles and cultural, (ii) pedagogical, (iii) technological, (iv) technical training, (v) time management.

Many students and also teachers who are convenience with face-to-face teaching and learning styles find some difficulties in adapting to the e-learning resources which force them to only interact with computers or notebooks [8]

3. E-learning in Indonesian Higher Education

Apart from its weaknesses, e-learning has been considered as an important part of academic life in many Indonesian Universities. The implementation of e-learning in higher education is highly encouraged by bodies which has high concern on education quality such as National Higher Education Accreditation Council (BAN-PT). This body has put e-learning as its part in assessment criteria.

The Indonesian law (Undang-Undang) has prescribed a university or any other higher education institutions with three main duties; teaching, research, and community service [9]. The availability of e-learning make the duties will become easier and time-saving but also can be challenging in any viewpoint. In the part of education that is mainly performed through teaching and learning activities, e-learning platform may eliminate the time used in classrooms with the approach of blended learning. This can be done because there are some materials that can only be delivered through the media effectively and efficiently. Some universities in Indonesia have made regularities of blended learning that is the teaching and learning activities that is blended between conventional and e-learning with certain portion. For example, Gajah Mada University has encouraged the lecturers to use e-learning and supported by Rector Regulation No 825/UN.1P/SK/HUKOR/2018 on Blended Learning. This means that lecturers may use e-learning with the maximum portion of 30% for e-learning and 70% for interaction in classroom meetings [10].

Specifically for the higher education institutions which prepare future teachers, they must always consider about these changing. They need to have a sharp prediction of what kinds of technology they need to equip for the future teachers. The teachers' important role in the future education success requires a good anticipation by current institutions of teacher education. Different from other disciplines, the higher education for teacher preparation such as college of teachers requires looking at these two points. The first point is the use of e-learning as a medium of instruction for their study and the second one is the teachers themselves need to understand e-learning for their future tool when they enter into teaching jobs. In the part of research, e-learning may have at least a couple of functions, the function as research objects and the function as a media or tool to conduct research. E-learning may become the central focus of for the purpose of data collection for the research such as the implementation of e-learning in a specific learning platform. It could be for distance learning to reach learners that are unreachable by classroom-setting learning [11]. E-learning materials and activities may function as data resources for the purpose of research and development in deploying e-learning in educational environment.

In the part of community service, the existence of e-learning may help personnel in higher education to interact to people and educate them without leaving the campus. In the case for the faculty of education where its main relevant communities are teachers and students at school, it can serve teachers for professional development through the e-learning system and help students perform the better. The availability of abundant technological devices enabling teaching from remote area will make the task of community services in education become easier. A group of teachers may sit down in a classroom hundreds kilometer away from campus may participate in a lecture as if they were in the campus. Today, there are many high reputation institutions of higher education which fully deliver online teaching and learning such as university of the people (headquartered in United States) and Islamic Online University (headquartered in Doha, Qatar). The students will learn from highly knowledgeable and professional lecturers across the globe. It does not matter that students live in remote area as long as they are connected to the internet. The students do not have to quit their job for the purpose of continuing their education with the flexible schedules of study time.

The availability of abundant job in information and communication technology field like the high demand in the skill of data science or big data, the role of e-learning at least can fill a little the big gap between the demand and supply in certain skills. The demand for data scientists today is growing much faster the available stocks.

4. E-learning and International Collaboration in Education

The possibility of international collaboration through e-learning today is higher than in the past [12], [13], [14].The rapid growing of information technology has made the world, particularly in educational sectors, as a small village that has no border in term of the flow of information and communication from one country to another. It gives the opportunities for academics and professionals in education a wide stage to collaborate in any activities of education [15], [16]. There are many

sectors that can be initiated to collaborate between educational institutions across the globe with the means of e-learning, such as joint lecture, students' mobility or students exchange, teachers' professional development, academics exchange, virtual seminars or conferences, etc.

Joint lecture may be performed by arranging the time between lecturers from two or more universities. They teach the same subject in one university even though the lecturers are not present in classroom. For example, the lectures are given by the domestic lecturer in the first six weeks and then followed by the guest lecturers from other university in the second six weeks, and so forth. This program may increase the students' experience on having lectures from remote university without leaving their own university. With the e-learning facility, students exchange program can be smoothly handled without losing contact with their origin university. The students may follow the activities from their own campus facilitated by e-learning facility (Learning Management System such as Moodle) even though they are in another campus thousands of miles away.

5. Conclusion

The implementation one of the fourth industrial product in education (e-learning) is a crucial thing in the effort to keep the educational processes and practices along with the development of technology, particularly the information technology. The use of e-learning may force the educational process run faster in term of accessibility and quality. The use of e-learning may reach people or young people in remote area which cannot be reached before at the lower cost. Besides that it open a wide variety of collaboration both at domestic and international level. It give the easy ways to connect one another among educational institutions.

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