The Overview of Needs Analysis for Development Learning Model Based on Digital in Vocational Education

Mukhlisin Mukhlisin[1,*], Hamsu Abdul Gani[2], Purnamawati Purnamawati[3]

[1]*Student of Graduated School of Vocational Education and Technical, Makassar State University, Indonesia*
[2]*Automotive Educational Engineering, Makassar State University, Indonesia*
[3]*Electronics Educational Engineering, Makassar State University, Indonesia*
[*]*Corresponding author. Email:* *mukhlisin@politeknikbosowa.ac.id*

ABSTRACT

A learning model can exist defined as a theoretical frame that describes an organized process for organizing learning exploits to achieve certain education designs and serves as an attendant for learning developers. The aim of this research was to describe the condition of the need for the development of digital-based learning models in vocational education. This type of research is descriptive qualitative research that aims to produce descriptive data derived from interviews or observations. The data needed in the research are (1) the conditions of the lecture implementation; (2) student characteristics; and (3) the required learning model. This research was carried out at the Ujung Pandang State Polytechnic and Bosowa Polytechnic. The research results obtained (1) In planning learning conditioning do not contain complex data that is applicable to the elaboration conditions and demands of the popular Industrial Revolution 4.0; The education exposure is conquered by lecturers, performing in a lecturer- centered learning process; and the learning media applied and related consequently far repaint existed used and optimized correctly. The learning process is considered less interactive and innovative so that it tends to make students easily bored and unfocused, and the performance of the learning process has not maximized the use of digital features or technology; (2) Currently, the use of gadgets among students has not been well optimized for learning to support digital-based learning; and (3) the learning model needed in vocational education is a learning model that is integrated with digital-based learning which is also a feature of the Industrial Revolution which makes the learning process active, innovative, and modern according to the characteristics of 21st Century Learning.

Keywords: Needs Analysis; Learning model; Vocational Education; Augmented Reality

1. INTRODUCTION

The current conditions indicate that the development of the Business and Industrial World (DUDI) is also undergoing very rapid changes. Trends that occur among society today have entered a new phase known as the period of the Industrial Revolution 4.0. This period was labeled by the digitalization operation in varied emplacements so that what existed firstly human as the base of the economy, has currently begun to be substituted by digital technology. The Industrial Revolution 4.0 is a complete conversion of all aspects of affair in the industry through the combination of digital technology and the internet with current industry [1].

These changes inevitably make DUDI compete to adapt to the demands of these changes so as not to be left behind and eroded by the wheels of time that continue to spin. Industry 4.0 is applied on three interrelated representatives, namely; 1) digitalization and profitable relation with simple approaches to economic networks with complex approaches; 2) digitization of outputs and services; and 3) new demand models [2].

This condition indicates the importance of mastering digital technology. Technological developments Digital is unstoppable and will continue to grow. The digital technology order can have both good and bad impacts depending on the designation and the way it is managed. To be able to compete and win today's global competition, the world of education, especially vocational education, must of course produce more competitive human resources according to needs. Vocational education aims to produce graduates who have certain applied skills and expertise in the fields of science, technology, and art, as well as produce applied research and activities that are beneficial to society [3].

In the Industrial Revolution 4.0, there are three new types of literacy, including data literacy, digital literacy, and human literacy. Mastery of new literacy for human resources vocational education graduates is very important because old literacy such as reading and writing is seen as no longer relevant to be used to compete

in this era [4]. The existence of Digital Transformation will certainly bring new opportunities in vocational learning innovation. Digitization in the world of education can be seen through the concept of digital learning, online courses, e-books, and integrated academic information systems. To be more competitive graduates, the curriculum in vocational education is needed for orientation a new that leads to the digital learning.

Digital competence is built so that human resources, especially teachers and students, can master digital technology. This is done to perfect the rate and grade of education. 21st century learning instructors are demanded to exist competent to effect digital learning content such as learning application programs, interactive presentations, learning animations, and others [5].

One of the digital technologies that can be used in learning is Augmented Reality (AR) technology. This technology provides an interesting learning atmosphere because it provides a more interactive, 3D, and real display. In addition, Augmented Reality (AR) technology is widely developed in the manufacture of multimedia learning presentations as a teaching tool in the learning process in the classroom, and does not replace the teacher. Digital learning is a system that can facilitate learners to learn more broadly, more, and varied. Through the facilities provided by the system, learners can learn anytime and anywhere without being limited by distance, space, and time [6]. Augmentation technology is the technology that best supports vocational learning in the 4.0 industrial revolution era. The technology is very efficiently used in the vocational learning process [7].

The utilization of Augmented Reality technology can increase understanding of the object being studied. In addition, the use of Augmented Reality technology is more effective than other learning media such as books, videos, and ordinary computer use [8]. The use of Augmented Reality technology has begun to be widely developed for the world of education as a learning aid. By using Augmented Reality a student can learn visually and interactively and more effectively with the form of virtual simulation teaching materials [9].

Based on this background, this research will examine the analysis of the need for the development of learning models based on digital in vocational education.

2. METHOD

Type of research is a qualitative descriptive study that aims to produce descriptive data derived from interviews or observations. The aim of this study is to determine the cautions that be and the conditions that exist in vocational education, especially in the application of digital technology in learning. The data needed in the research are (1) the conditions of the lecture implementation; (2) student characteristics; and (3) the required learning model. This research was carried out at the Politeknik Negeri Ujung Pandang and Politeknik Bosowa. This study uses a qualitative approach where the investigator acts as the crucial instrument or the main inquisition.

3. RESULT AND DISCUSSION

Analysis of needs is the first step in this research. At this stage, the needs analysis is carried out using the initial observation and documentation method. The scope of the implementation of initial observations consists of analysis of lecture implementation, analysis of student characteristics, and analysis of required learning models.

3.1. Analysis of Implementation Learning

Analysis of the implementation of learning includes planning activities and the learning process at the Politeknik Negeri Ujung Pandang and Politeknik Bosowa. Based on the results of observations that have been made, several things have been obtained. The description is explained as follows.

3.1.1. Learning Plan

Based on the results of observations made at the Ujung Pandang State Polytechnic and Bosowa Polytechnic, information was obtained on the initial conditions of learning planning, namely: (1) Learning activities did not contain system information that was relevant to the development conditions and needs of the current Industrial Revolution 4.0; (2) The learning exposure is conquered by lecturers, performing in a lecturer- centered learning operation; and (3) the learning media applied and related so far commandant existed duly applied and optimized.

3.1.2. Learning Process

After observing the learning plan, then observing the implementation of the learning process. After the implementation of the observation of the learning process, information was obtained, namely: (1) The orientation of learning is still centered on the lecturer; (2) The implementation of learning has not implemented a typical learning model; (3) The learning process is considered less interactive and innovative so that it tends to make students easily bored and unfocused; and (4) the accomplishment of the learning process has not maximized the application of digital features or technology.

3.2. Analysis of Students Characteristics

Observation results acquired information that students who are anymore in lectures are conquered by Generation Z or alike called i-Generation who enjoy existed friendly with technology since youth and are familiar with smart widgets that laterally affect their character.

Currently, most Ujung Pandang State Polytechnic students and Bosowa Polytechnic students have used gadgets as communication support devices, various activities, and access to information. The availability of various features offered by the device is certainly smart to make a space to be utilized in learning so that learning is more interesting and interactive.

The high use of gadgets among students has not been able be optimized to support technology-based learning. Students are less able to explore various features offered by gadgets. Students tend to use gadgets only for communication and social media purposes. This is due to the limited knowledge and abilities of students in the field of digital technology. Therefore, the use of gadgets should be maximized to support digital-based learning such as Mobile Learning, Blended Learning, Social Media Based Learning, and Augmented Reality.

3.3. Analysis of Learning Models Required

Various problem analyses that have been previously disclosed have become the basis of researchers' thinking in developing Augmented Reality-based Learning Models at Polytechnics. This learning model is accepted to be capable to (1) comprehend the applicability challenged in the Industrial Era4.0 which focuses on digitization; (2) Integrating digital-based learning which is also a feature of the Industrial Revolution 4.0; (3) Creating an active, innovative, and modern learning process according to the characteristics of 21st Century Learning; and (4) the integration of learning tools that can facilitate the demands of the world of work in the future.

Augmented Reality (AR) is a technology that combines two-dimensional or three-dimensional virtual things into a authentic three-dimensional contexture and additionally projects these virtual things in real- time. Virtual things display information in the configuration of markers or virtual things that can exclusively be caught with a cellphone camera or with a computer [10].

The advantages of AR are as follows: (1) additionally interactive; (2) efficient in use; (3) can be extensively enforced in varied media; (4) thing modeling simply because it exclusively displays a limited objects; (5) manufacture that does not cost too much; and (6) easy to operate [11]. Some of the applications of AR in the world of education are those that can be applied to e-books [12].

Applications AR can be operated based on markers to be used as teaching materials or learning media. Some of the tools used include application programs Vuforia and Unity which have good support and documentation. Unity is the platform development game best for building games high-quality 3D and 2D. In this study, the plugin Unity with Vuforia was used to develop material AR.

AR has three main technological advantages, namely: (1) Intelligent display technology; this technology allows supported by various displays based on intelligent screen display; (2) Intelligent 3D Registration; with the use of this feature, it is possible to pour virtual images into the real world; and (3) Intelligent interaction technology; With the development of intelligent interaction technology, AR not only superimposes virtual information onto real scenes but also realizes interactions between virtual people and objects in real scenes [13].

4. CONCLUSION

Based on the results of observations, learning in vocational education today should be carried out using new learning designs that collaborate directly with digital technology into the learning process according to the needs in the era of Digital Transformation and the current era of the Industrial Revolution 4.0, so that students can learn at the same time directly related to digital technology. The use of various media, gadgets and artificial intelligence in learning can certainly provide a more varied and enjoyable learning atmosphere and experience. The digital skills gained will certainly be useful for students when they enter the workplace.

Vocational education providers should take a role and place themselves in the current era of Digital Transformation and Industrial Revolution 4.0. This needs to be realized considering that vocational education requires learning designs that are adaptive to changes in industrial and workplace. Thus, vocational education is expected to make a real contribution in producing superior human resources who are ready to competition.

Another problem caused by the impact of Industrial Revolution 4.0 is the digitalization process. The phenomenon of digitalization in aspects of human life in the Industrial Revolution 4.0 is increasing sharply. This phenomenon can be found in various people's daily lives, such as digital computer technology, digital games, digitizing the use of currency (e-money), the use of digital media (e-media) to the industrial and manufacturing sectors. In the era of the Industrial Revolution 4.0, industrial and business models underwent major changes, not only in the production process but also throughout the industrial value chain that was moving towards the digitization process.

Digital transformation is an ongoing process in industry and manufacturing. The Industrial Revolution 4.0 in principle is to empower the role of industrial and manufacturing digitization as well as supply networks that involve the integration of information from various sources and locations. The use of digital technology is used to drive industry as well as manufacturing and physical distribution. The integration between data technology and assignments technology is charactered by relegation association physical part hops from digital to material. Therefore, preparing industrial human resources capable of integrating digital features needs to be encouraged, including for vocational education providers. Therefore, learning that integrates digital technology in learning can be said to be very relevant to today's needs.

The use of AR technology in learning gets a good response from users and is suitable for use as a supporter of the learning process. The results of this study indicate that the use of augmented reality technology is easy to use and easy to install on smartphone devices [14].

The use of AR is very useful for interactive and real learning processes and directly by students. In addition, learning media using AR can increase students' interest in learning because of the nature of AR which combines the virtual world which can increase the imagination of students with the real world directly [11]. In addition, students after receiving AR -based learning get a high increase in learning outcomes [14].

REFERENCES

[1] A. Merkel, "Speech by Federal Chancellor Angela Merkel to the OECD Conference," *OECD Confrence*, 2014. https://www.bundesregierung.de/breg-en/chancellor/speech-by-federal-chancellor-angela-merkel-to-the-oecd-conference-477432 (accessed Oct. 25, 2020).

[2] M. Yahya, "Era Industri 4.0: Tantangan dan Peluang Perkembangan Pendidikan Kejuruan Indonesia," *Pidato Pengukuhan Penerimaan Jab. Profr. Tetap dalam Bid. Ilmu Pendidik. Kejuru. Fak. Tek. Univ. Negeri Makassar*, 2018.

[3] Y. Yunus, "Peningkatan Sumber Daya Manusia Indonesia Melalui Pendidikan Vokasi," *Pros. SNYube*, 2013.

[4] J. E. Aoun, *Robot-proof: higher education in the age of artificial intelligence*. US: MIT Press, 2017.

[5] T. Blyznyuk, "Formation of Teachers' Digital Competence: Domestic Challenges and Foreign Experience," *J. Vasyl Stefanyk Precarpathian Natl. Univ.*, vol. 5, no. 1, pp. 40–46, 2018.

[6] Munir, *Pembelajaran Digital*. Bandung: CV. Alfabeta, 2017.

[7] P. Sudira, *Paradigma Baru Pembelajaran Vokasional Era Revolusi Industri 4.0: Membangun SDM Digital Among Kreativitas Dagang Inovasi*. Yogyakarta: Univeristas Negeri Yogyakarta, 2020.

[8] E. Setiawan, U. Syaripudin, Y. A. Gerhana, J. T. Informatika, and F. Sains, "Implementasi Teknologi Augmented Reality Pada Buku Panduan Wudhu Berbasis Mobile Android," vol. I, no. 1, pp. 28–33, 2016.

[9] A. Ihsan, M. Munawir, and F. Amir, "Implementasi Augmented Reality Sebagai Media Pembelajaran Pengenalan Operasi Hitung Matematika Pada TK atau Paud Permata Bunda Langsa," *JURUTERA-Jurnal Umum Tek. ...*, 2017, [Online]. Available: https://www.ejurnalunsam.id/index.php/jurutera/article/view/1580.

[10] S. W. Sari, "Multimedia Presentasi Pembelajaran Berbasis Augmented Reality untuk Pengenalan Pancaindra dalam Mendukung Mata Pelajaran IPA Tingkat Sekolah Dasar," *Fak. Ilmu Komput. Univ. Dian Nuswantoro*, 2018.

[11] I. Mustaqim, "Pengembangan Media Pembelajaran Berbasis Augmented Reality," *J. Edukasi Elektro*, vol. 1, no. 1, pp. 36–48, 2017.

[12] O. Alkhamisi, "Rise of Augmented Reality: Current and Future Application Areas," *Int. J. Internet Distrib. Syst.*, vol. 1, no. 1, pp. 25–34, 2013.

[13] P. Chen, X. Liu, W. Cheng, and R. Huang, "A review of using Augmented Reality in Education from 2011 to 2016," *Innov. smart Learn.*, 2017, [Online]. Available: https://link.springer.com/chapter/10.1007/978-981-10-2419-1_2.

[14] B. Setyawan, "Augmented Reality Dalam," vol. 07, no. 01, pp. 78–90, 2019.