sainteknol
JURNAL SAIN DAN TEKNOLOGI

Transformation of Learning Technology in Community Learning Centers in the Era of Industry 4.0 Revolution

Lilis Karwati[1], Lulu Yuliani[2], Bayu Adi Laksono[3]

[1,2,3]Community Education, FKIP, Universitas Siliwangi, Tasikmalaya, Indonesia

Email: liliskarwati@unsil.ac.id

Abstract

Technological developments are developing very rapidly along with the times. The conditions of the Covid pandemic that occurred also contributed to the process of developing technology used by the community. Likewise in terms of education The rapid development of information technology has an impact on the teaching and learning process which requires educational institutions to also use technology as a teaching and learning process in order to improve the quality of education according to what is to be achieved in improving the quality of education non-formal educational institutions must also be willing to transform the teaching and learning process as a whole. conventional towards a technology-based teaching and learning process. as well as a shift in the curriculum that is currently used is an independent curriculum, the learning process focuses on the competence and character of students as well as a flexible learning process in the sense of freeing tutors and students. The purpose of this study was to find out the transformation of learning technology in community educational institutions in the industrial era 4.0 in Tasikmalaya City. The research method used is qualitative research with data collection techniques of interviews, observation and documentation. The results of the research to be achieved are changes in the teaching and learning process that have been carried out by community education institutions so that it can make it easier for students to follow the learning process and can be applied when students graduate later, the transformation of the use of technology in the learning process can also improve the quality of education.

Keywords: technology transformation, non-formal education, industry 4.0

INTRODUCTION

Education 4.0 is a phenomenon that responds to the need for the fourth industrial revolution, where humans and machines are aligned to find solutions, solve problems, and of course, find new innovative possibilities. This 4.0 era has implemented the concept of automation carried out by machines and does not involve human labor. It describes various ways to integrate cyber technology both physically and non-physically into learning (Hasanah, 2009). All the demands of this era have demanded a conception of the goals of education that must prepare skills that can produce superior human resources. The skills needed to meet the demands of the 4.0 industrial revolution are known as 4C skills (collaborative skills, creative skills, critical thinking, and communication skills). The main role of education is to increase human resources that are able to meet the demands of a constantly evolving life according to the needs of the times. In general, the 4.0 industrial revolution has changed the way people think, live, interact, and relate to each other (Mujahada, 2019).

New technologies and approaches that fundamentally merge the physical, digital, and biological worlds will change the way humans live and interact (Muhammad, 2018). Industry 4.0, as a phase of technological revolution, changes the way humans act on a scale, scope, complexity, and transformation from previous life experiences. The progress of the next generation of the nation also

needs to adapt to the developments of the times so as not to fall behind in both the technology of education and the learning curriculum. The industry 4.0 revolution also impacts the education sector in Indonesia, starting with the digitalization of the education system, which requires all elements in the education sector to adapt to the changes that occur (Rohman & Ningsih, 2018). The challenge in the education sector in facing industry 4.0 is the inculcation of educational values that need to be developed. In Indonesia, the need for non-formal education is increasing (Syamsuar & Reflianto, 2019).

Through non-formal education, the community can not only acquire knowledge but also develop skills to be independent and able to face challenges in their daily lives, including facing and preparing for the industry 4.0 revolution. Education in the community, as it develops and changes with the times, means providing something needed by the community (Saifuddin, 2006). Community education institutions must also be able to be independent and have quality in the implementation of education delivery, referring to well-considered considerations due to the many startups in the education sector, the community wants to easily access education, marketing services can be wider, community access to training is more open, easy access, flexible, relatively cheaper. The challenge for educators in the era of the industry 4.0 revolution is to be able to change strategies and learning models that are in line with the demands of the times and technology. Education must be able to run the transformation of technology in order to serve the needs of students in the education world. that is able to compete in the current industry era. Based on the problems already mentioned, the researcher is interested in studying the transformation of technology in community education institutions in supporting learning needs in the industry 4.0 era.

METODE

The research method that uses scientific methods is expected to obtain objective, valid, and reliable data. This study uses a descriptive case study method because this method will delve deeper into the research problem and reveal the uniqueness and specificity of this research. Descriptive research is the act of describing and interpreting data related to facts, conditions, variables, and phenomena that occur during the research process and presenting them as they are (Subana, 2005). The approach used in this research is a qualitative approach to more deeply study the transformation of technology in the teaching and learning process in educational institutions serving the community, namely community learning centers (CLC) in the Industry 4.0 era. The data collection techniques used in this research are as follows: interviews, observations, and document studies. Data collection through previous studies such as archives, opinions, theories, evidence, laws, and others is also used.

RESULT AND DISCUSSION

The discussion of the results of the research on forms of technology that support teaching and learning activities is e-learning, which is not limited by place and time, easy to access learning in the education of the community through information technology for more efficient and effective implementation. The term e-learning is used as a term for any technology used to support teaching efforts through electronic internet technology (Purbo & Hartanto, 2002). In the transformation of education in the community, learning can be carried out individually with a technology and data-based learning system tailored to the individual abilities and learning needs of students. Adaptive learning media is a media that meets the needs of the user's condition and learning environment. Students have the option of determining how they learn, students will be able to modify their learning process with the tools they feel necessary for them (Abdullah, 2017).

The combination of face-to-face learning and distance learning (blended learning), flipping the classroom and bringing their own learning tools (bring your own device) form important terminology in this change in line with the view (Slameto, 2015) that learning is essentially an effort process carried out by an individual to obtain new behavior changes as a whole, as a result of his own

experiences in interacting with the environment. Whereas Project-based learning emphasizes student activities to produce a product by applying research, analysis, creation, and presentation skills based on real-life experiences. Design, scheme, written work, art work, technology/practical work, and values are in line with the view that project-based learning is a learning model that uses problems as the first step in collecting and integrating new knowledge based on real experiences in activities, and related to field experiences (Baker et al., 2011). The advancement of technology in effective learning is deepened through courses or training. The real-world skills of accessing, gathering, and using technology to obtain or convey information (message or content, material) in learning. A truly effective learning experience must utilize all of the learning wheel, from setting goals, observing and experimenting, reviewing and planning action processes, and evaluating learning conducted by the tutor in helping the learner during the learning process.

"Students' interpretation is expected to have the competence to apply their knowledge and skills to make conclusions based on logic and data trends. Activities that have the goal of combining various results of analysis made in various forms, such as criteria forms, question forms, or specific standards. Therefore, various problems can be answered while the assessment is diverse. Measuring students' abilities when applying knowledge can be tested when students work on their field projects. Work assessment Assessment through portfolio. Self-assessment peer assessment and school-outside assessment examining the student while he is at home or outside of school. Diverse assessment as an effort made by tutors to obtain an objective assessment. Assessment as a systematic effort through the collection of valid and reliable data or information, and then processing the data or information as an effort to make considerations for taking policy decisions on an education program.

Meanwhile, the trend shift in education 4.0 in the education world supports indicators in non-formal education institutions as follows: Active online presence, the main feature of digital transformation is the change of education from offline to online or hybrid. Collaborative, digital media in completing learning and capitalization and use of data, Go online, digital transformation is not just about changing to online, but how through digital transformation brings education to develop and maintain its existence through the utilization of virtualization technology, mobile computing, cloud computing, integration of all systems in the organization into something new or of new value. In line with the opinion, there will be many changes in the appearance of the class to face the industry 4.0 revolution. The changes include flexible tasks for students to accommodate various learning styles (Hussin, 2018). Efforts made by community education institutions (Community Learning Centers) in accommodating the learning needs of the community are presented as follows.

Digital Transformation (E-Learning)

The Community Learning Center facilitates community members in accessing learning by creating an e-learning system. With e-learning, community members can learn anytime, anywhere, and have easy access to learning materials, so digital transformation can help support learning needs. Some of the real benefits of using the e-learning system are that students can easily access materials from anywhere without being limited to institution and country boundaries, students can easily seek guidance and discuss with experts or specialists in their field of interest, and materials can easily be accessed from various parts of the world regardless of where the student is learning (Mutia & Leonard, 2015). In line with these findings, the virtual class (e-learning) learning model is a new breakthrough in teaching and learning, as it can minimize differences in teaching methods and materials, providing more consistent quality learning standards.

The e-learning system is essential to anticipate the development of the times with the support of information technology where everything is heading towards the digital era, both in terms of mechanism and content (Elyas, 2018). In this case, the Community Learning Center (CLC) carries out digital transformation of learning with various considerations, one of which is the widespread use of this system by educational institutions, especially in the condition of educational institutions that during the covid are forced to change the system. The e-learning concept has been widely accepted by the world community, as evidenced by the widespread implementation of e-learning in educational institutions (schools, training centers, and universities) as well as industries (Sudaryanto, 2012).

The Community Learning Center (CLC) uses both synchronous and asynchronous methods to meet the learning needs of students. The materials presented to students are more focused on

asynchronous methods to provide flexibility in accessing materials. This is in line with research stating that for asynchronous media, audio or video recording media can be used. This type of media can be used flexibly and cheaply, but the dynamism of content is a drawback. This type of media must be updated regularly to avoid stagnant or outdated material or content. Before determining the learning media for e-learning, careful planning should be done to ensure that e-learning runs optimally (Tafqihan, 2011).

Adaptive Learning

Community Learning Centers (CLC) not only prepare distance learning, but still use limited face-to-face meetings. This is in line with studies that state that e-learning cannot fully replace conventional learning activities in the classroom, but e-learning can be used as a supplement or complement to learning. The use of e-learning in the learning and teaching process allows for the creation of human resources who are familiar with and able to interact and utilize information and communication technology/the internet (Sari, 2017). Before carrying out the learning process, CLC identifies the needs required for learning to make it easier for students. This is in line with research stating that the stages in the development of adaptive learning are first identifying the school's needs related to the digital curriculum and digital learning, then developing a draft of an adaptive virtual set-based digital curriculum and learning in response to the challenges of 21st century education (Wicaksono et al., 2021).

The ease of adaptive technology-based learning is also demonstrated by research stating that an e-learning system that can initialize content according to the characteristics of students. The system can track information from students starting from taking teaching materials or entering a virtual class, to taking exams and completing a teaching material. The level of knowledge of students is determined based on test scores at the beginning when students register to enter the virtual class, and the results are then updated into the e-learning system for use in the adaptive process (Ruliah, 2017).

In the implementation of learning, CLC students are previously equipped with an understanding of technology in learning and a guide on how to carry out the learning process. In addition to students, learning facilitators are also given an understanding of the technical procedures for learning. This is in line with studies stating that adaptive technology-based learning is providing detailed guidance on designing and developing an e-learning course for trainers and instructional designers who are new to e-learning design. It also provides basic concepts and information about the processes and resources involved in e-learning development, which may be of interest to students and make it easier for students to learn (Iksan, 2018).

Modification of the Learning Process

The process of learning for each individual certainly has differences, as does the Community Learning Center (CLC). In the technology transformation process carried out at the Community Learning Center (CLC), the manager directs the learning process that has meaning, namely a learning process that is aimed at solving problems in the environment and daily life. This is intended to align an individual's personal life with the theme of learning, so that the material being studied is in line with the real context in the field. This is in line with research that states that the creativity of students will increase with the modification of learning media as a result of problem solving (Iskandar, 2016). Further modification of material, facilities and infrastructure, as well as regulations can optimize the learning objectives (Muliadi, 2022).

In addition to learning modification, the manager of the Community Learning Center (CLC) also directs students to independently and responsibly manage their own learning system. Each material presented by the tutor has its own billing and standards, so students must really manage their learning style. This is in line with research that states that students have been given the opportunity to learn to manage things within and outside themselves using self-regulated learning strategies by analyzing, planning, implementing, monitoring, modifying and metacognition. The calculation using SPSS found a significant average difference between before and after the self-regulated learning treatment was carried out, which means that the implementation of the self-regulated learning treatment to modify the academic procrastination of students is effective (Umah, 2021).

In addition to aligning learning with real-world conditions and implementing self-regulated learning, the managers of the Community Learning Center (CLC) also apply project-based learning. Students are asked to create activities in their learning that result in a product. Students at the Community Learning Center (CLC) are directed, among other things, to create a collection of writing related to the subject being studied. Project-based learning practice greatly supports learning outcomes, which is supported by studies that show there is a significant difference in the learning outcomes of biology between students who are taught with a project-based learning model and direct learning model (Jagantara et al., 2014). Furthermore, project-based learning has also been proven to increase students' creativity (Rati et al., 2017) and has a significant difference in the areas of concept understanding and critical thinking skills compared to conventional learning (Sastrika et al., 2013)

CONCLUSION

The institution is able to survive by massively changing the learning system. The findings indicate that Community Learning Centers (CLC) apply technology transformation in learning by applying e-learning, learning is formed adaptively, and modifying the learning process according to the needs of both students and tutors. This research is still on a limited scale in Tasikmalaya City, it needs to be deepened with a wider target coverage with different characteristics of Community Learning Centers (CLC) so that the data obtained is more realistic and has a wider usefulness.

References

Abdullah, R. (2017). Pembelajaran Dalam Perspektif Kreativitas Guru Dalam Pemanfaatan Media Pembelajaran. *Lantanida Journal*, *4*(1), Art. 1. https://doi.org/10.22373/lj.v4i1.1866

Baker, E., Trygg, B., Otto, P., Tudor, M., & Ferguson, L. (2011). *Project-Based Learning Model Relevant Learning For The 21st Century. Pacific Education Institute*.

Elyas, A. H. (2018). Penggunaan Model Pembelajaran E-Learning Dalam Meningkatkan Kualitas Pembelajaran. *Warta Dharmawangsa*, *56*, Art. 56. https://doi.org/10.46576/wdw.v0i56.4

Hasanah, N. (2009). *Konsep pendidikan Islam perspektif Mahmud Yunus* [Undergraduate, IAIN Sunan Ampel Surabaya]. http://digilib.uinsby.ac.id/7698/

Hussin, A. A. (2018). Education 4.0 made simple: Ideas for teaching. *International Journal of Education and Literacy Studies*, *6*(3), 92–98.

Iksan, M. (2018). Pelatihan Pembelajaran Berbasis E-Learning. *Jurnal Pengabdian Pada Masyarakat MEMBANGUN NEGERI*, *2*(2), Art. 2. https://doi.org/10.35326/pkm.v2i2.360

Iskandar, A. C. (2016). Meningkatkan Kreativitas Memodifikasi Media Pembelajaran Micro Teaching Penjas Dengan Metode Problem Solving Mahasiswa Ikip Pgri Pontianak. *Jurnal Pendidikan Olah Raga*, *5*(2), Art. 2. https://doi.org/10.31571/jpo.v5i2.382

Jagantara, I. M. W., Prof. Dr. Putu Budi Adnyana, M. S., & Dr. Ni Luh Putu Manik Widiyanti, S. S. (2014). Pengaruh Model Pembelajaran Berbasis Proyek (Project Based Learning) Terhadap Hasil Belajar Biologi Ditinjau Dari Gaya Belajar Siswa Sma. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, *4*(1), Art. 1. https://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/1300

Muhammad, Y. (2018, April 3). *Era Industri 4.0: Tantangan dan Peluang Perkembangan Pendidikan Kejuruan Indonesia* [Other]. eprint.unm.ac.id. http://eprints.unm.ac.id/6456/

Mujahada, K. S. (2019). Memperkuat Eksistensi Pendidikan Islam dalam Menghadapi Era Revolusi Industri 4.0. *SALIHA: Jurnal Pendidikan & Agama Islam*, *2*(2), Art. 2. https://doi.org/10.54396/saliha.v2i2.28

Muliadi, M. (2022). Kreativitas Guru Pendidikan Jasmani dalam Memodifikasi Sarana dan Prasarana Pembelajaran di Sekolah Dasar. *Jurnal Pendidikan Tambusai*, *6*(1), Art. 1.

Mutia, I., & Leonard, L. (2015). Kajian Penerapan E-Learning Dalam Proses Pembelajaran Di Perguruan Tinggi. *Faktor Exacta*, *6*(4), Art. 4. https://doi.org/10.30998/faktorexacta.v6i4.239

Purbo & Hartanto. (2002). *Buku Pintar Internet Teknologi E-learning Berbasis PHP dan MySQL*. PT Elex Media Komputindo.

Rati, N. W., Kusmaryatni, N., & Rediani, N. (2017). Model Pembelajaran Berbasis Proyek, Kreativitas Dan Hasil Belajar Mahasiswa. *JPI (Jurnal Pendidikan Indonesia)*, *6*(1), Art. 1. https://doi.org/10.23887/jpi-undiksha.v6i1.9059

Rohman, A., & Ningsih, Y. E. (2018). Pendidikan Multikultural: Penguatan Identitas Nasional Di Era Revolusi Industri 4.0. *Prosiding Seminar Nasional Multidisiplin*, *1*, 44–50.

Ruliah, R. (2017). Model E-Learning Adaptif Dengan Pendekatan Karakteristik Mahasiswa. *Jutisi : Jurnal Ilmiah Teknik Informatika dan Sistem Informasi*, *6*(1), Art. 1. https://doi.org/10.35889/jutisi.v6i1.237

Saifuddin, A. F. (2006). *Antropologi Kontemporer: Suatu Pengantar Kritis Mengenai Paradigma*. Grafindo Persada. http://digilib.fisipol.ugm.ac.id/handle/15717717/16644

Sari, I. P. (2017). Implementasi Pembelajaran Berbasis E-Learning Menggunakan Claroline. *Research and Development Journal of Education*, *4*(1), Art. 1. https://doi.org/10.30998/rdje.v4i1.2070

Sastrika, I. A. K., Sadia, W., & Muderawan, I. W. (2013). Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Pemahaman Konsep Kimia Dan Keterampilan Berpikir Kritis. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, *3*(2), Art. 2. https://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/799

Slameto. (2015). *Belajar Dan Faktor-Faktor Yang Mempengaruhinya*. Rineka Cipta.

Subana, M. (2005). *Dasar-dasar penelitian ilmiah*.

Sudaryanto, D. H. (2012). Proses Pembelajaran Melalui Media Elektronik (e-Learning). *Swara Patra : Majalah Ilmiah PPSDM Migas*, *2*(1), Art. 1. http://ejurnal.ppsdmmigas.esdm.go.id/sp/index.php/swarapatra/article/view/35

Syamsuar, S., & Reflianto, R. (2019). Pendidikan Dan Tantangan Pembelajaran Berbasis Teknologi Informasi Di Era Revolusi Industri 4.0. *E-Tech : Jurnal Ilmiah Teknologi Pendidikan*, *6*(2), Art. 2. https://doi.org/10.24036/et.v2i2.101343

Tafqihan, Z. (2011). Karakteristik Dan Pemilihan Media Pembelajaran Dalam E-Learning. *Cendekia: Jurnal Kependidikan Dan Kemasyarakatan*, *9*(2), Art. 2. https://doi.org/10.21154/cendekia.v9i2.871

Umah, R. Y. H. (2021). Memodifikasi Prokrastinasi Akademik Mahasiswa dengan Mengoptimalkan Self-Regulated Learning. *EDUKASIA: Jurnal Pendidikan Dan Pembelajaran*, *2*(1), Art. 1.

Wicaksono, D., Suradika, A., Winata, W., & Shodiq, N. A. (2021). Pengembangan Model Kurikulum Digital Dan Pembelajaran Berbasis Virtual Set Adaptif Di Smk Atlantis Depok. *Instruksional*, *3*(1), Art. 1. https://doi.org/10.24853/instruksional.3.1.40-49