The Implementation of E-Learning to Improve Students’ Virtual Activities

Muhfahroyin\textsuperscript{1, 2}* and Eko Susanto\textsuperscript{1}
\textsuperscript{1}Universitas Muhammadiyah Metro, Kota Metro, Lampung, Indonesia.
\textsuperscript{2}Head of Learning Forest Laboratories, Universitas Muhammadiyah Metro, Indonesia

*muhfahroyin@yahoo.com

Abstract. In the 21st century, it is required to have high-quality human resources with high performance in the virtual communication and disruption technology. Through an e-learning, the students can learn and practice in virtual learning activities to facing the industrial revolution 4.0. It requires condition which can overcome the virtual and real living problems. The purposes of this research are to implement e-learning to increasing the students virtual activities of biology education students. The research method was to implement e-learning conducted by using classroom action research. The research was implemented in the even semester academic year 2016/2017 in biology innovative learning subject. Based on the data analysis, the conclusion can be formulated that e-learning can improve the students virtual activities with percentage average score is 43.19%. Based on the research, the researcher suggests that the teachers need to implement e-learning media in the learning process. Hopefully, the learning can prepare the students habit to webbed and ready in the digital era and disruption technology.

1. Introduction

The world development today changes drastically from conventional technology into disruption of information technology in the industry 4.0 era. This phenomenon is market with human activity digitalization in their daily life. Life data are connected virtually, so that it is called with big data era. This information technology change happens to all life aspects including economy, social, politic, health, culture, state administration, and education (Schwab, 2017). In the human welfare context, the human life digitalization is very helpful in accelerating information, communication, and transaction processes. The human generation born in this era become a generation which is instantaneous in all aspects and this generation is called as millennial generation. Human communication and information activities, which is formerly taking multiple days or months to take place, are now can be done in seconds.

This Industry 4.0 era is able to change systems of works, professional structures, and competences required in the working activities. In this digital era, people do borderless activities (Schwab, 2017). Communication is done through digital message and it can be realized in seconds. People buy their life necessities with applications without visiting physical markets. People do purchasing with electronic money. Almost all activities are done with online systems. The human activity shifts into technology disruption era require more and more competence human resources than the previous era. To prepare competent human resources in this digital era, it requires all party roles since elementary schools to universities.
The higher schools as providers for science and knowledge reinforcement are required their preparedness to create graduates with abilities to have job and be actors in the digital era. This technology disruption era shifts the learning paradigm (Doucet, 2018). Subsequently, education practitioners and observers must change the concept and paradigm to education in preparing the next generation. The paradigm changes happen in the learning system such as learning methods, learning sources, learning media, academic information systems, etc. A student-centered learning is implemented with full innovation and fulfilling the students’ curiosities (Wena, 2011; Martin, 2018). Therefore, students must be prepared with professional competences and abilities to master digital application based technology. Education in the digital era and disruptive technology today need learning implementation with virtual and online systems in form of e-learning to empower information and communication technology learning sources (Sutrisno, 2012; Donally, 2018).

Students, through e-learning system, can access learning and report their learning processes through online based media, for example, can be accessed using a smartphone (Mufrihah, 2017). The e-learning serves as a subject management e-learning (Jonassen, 2004; Wang & Gearhart, 2006). For students still learning with physical meeting, this e-learning can be used as learning supports for this (Clark & Richard, 2003). In this case, lecturers and students are still conducting face-to-face learning but their activities can use e-learning. Lecturers can deliver learning plan by e-learning, do online discussion outside learning hours, upload learning materials, do quiz and test, do remedial and enrichment. In another side, students can do e-learning based activities such as downloading learning plan from lecturers, downloading learning materials, doing quiz and test, discussing, uploading working results, etc.

2. Methods
This was a class action research which was conducted in even semester of academic year 2016/2017. The research subject was students joining Biology Learning Innovation subject. The research object was the use of e-learning to improve students’ learning activities. This class action research was done in two cycles: cycle 1 and cycle 2. Steps in each cycle consisted of planning, implementation, observation, and reflection.

Action planning in this research was conducted in the following steps: 1) making agenda and learning instrument, preparing learning scenario, preparing e-learning moodle for media learning, preparing equipment and materials to use; 2) composing face-to-face learning design supported with e-learning; 3) composing observation and evaluation instruments. Instruments were composed for observations to students’ activities.

Action implementation was done in classical face-to-face learning and online. The lecturers did learning activities by uploading learning plans, learning materials, and guides for activities. Students did learning activities with online discussion, downloading-uploading, working online assignments, and cooperating within learning groups.

Observation and evaluation was done by lecturers while students did their e-learning activities. Observation focused on students learning activities such as online discussion, downloading-uploading, working online assignments, and cooperating within learning groups.

After learning was observed, reflection was conducted by evaluating all learning scenarios had been done by students. This reflection was used as a reference to plan and determine subsequent actions in the next cycle.

Observation data result of each cycle was presented in form of student’s learning activity improvement percentage and was visualized in graphics. A descriptive narrative analysis was presented to see the student’s virtual activity change.


3. Result and Discussion

3.1. Respondents answer pattern
Research results could be described based on indicators of students’ learning activities. They were online discussion, downloading, uploading, working online assignment, and cooperating within learning groups. The visualization of all activities can be seen at Figure 1.

![Figure 1. Comparison of the activity cycle 1 and cycle 2](image)

Based on the Figure 1, the narrative description of research results and discussion of e-learning implementation are as follows.

3.2. Discussion Activity
Discussion activity was conducted by students both in groups and in classical way. In the cycle 1, the average of discussion activity score was 65.35 with highest and lowest score of 72 and 61 respectively. Discussion activity score average in cycle 2 was 83.41 with highest and lowest score of 93 and 78 respectively. Comparing the score between cycle 1 and cycle 2, there was 27.63% improvement. This discussion activity was conducted to solve problems related to assignments in each group. Students understood materials easier when they discussed them with their mates. By this discussion, learning atmosphere became more conducive and fun for the students. They were more relax in solving problem together within their groups, they trained to think critically and creatively (Mamo, 2017). Similarly, Dewi et.al. (2018) also stated that discussing learning materials digitally would improve students’ metacognitive abilities. Virtual discussion in e-learning enabled students to be more open in expressing ideas (Clark & Mayer, 2003; Jonassen, 2004). Discussion time was also not limited in the lecturing time, students could do it whenever and wherever because they were connected online in e-learning media.

3.3. Working assignment activity
Working assignment activities were done by students both by individually and by group. The average of working assignment activity in cycle 1 was 67.53 with highest and lowest score of 75 and 62 respectively. The average of working assignment activity in cycle 2 was 83.35 with highest and lowest score of 92 and 80 respectively. There was 23.43% improvement from cycle 1 to cycle 2. This working assignment activity improvement occurred because there were personal and group responsibilities in finishing assignments given by lecturers. Cahyani et.al. (2014) stated that multimedia helps would improve students’ cognition abilities and scientific works. In this case students had high curiosities and wanted to finish online assignment. This scientific curiosity appeared when students got learning media which previously not given.
3.4. Downloading material activity
Virtual activity in downloading materials was conducted by students to understand learning substantial. The average of downloading material activity in cycle 1 was 49.88 with highest and lowest score of 55 and 43 respectively. The average of downloading material activity in cycle 2 was 83.82 with highest and lowest score of 94 and 79 respectively. There was 68.04% improvement from cycle 1 to cycle 2. Downloading material activity occurred along with developing reference sources in digital era. Learning sources could be easily located in virtual world, so that students could easily download them for learning materials. By computer and online based learning, students got used to do virtual activities like downloading and uploading files (Rusman, 2012; Mukhtar and Iskandar, 2012).

3.5. Assignment uploading activity
Uploading activity was done by students both for individual and group assignments. The average of assignment uploading activity in cycle 1 was 49.47 with highest and lowest score of 54 and 43 respectively. The average of downloading material activity in cycle 2 was 86.06 with highest and lowest score of 94 and 80 respectively. There was 73.93% improvement from cycle 1 to cycle 2. This assignment uploading activity became possible because of online virtual facilities and supported by e-learning information system. Communication between students and lecturers in collecting students’ assignments became easier and could be done outside lecturing time. In addition, students’ communication with lecturers were more flexible and easy to do by contributing e-learning. Lecturers had not to collect students’ assignments face-to-face.

3.6. Cooperation activity
Cooperation activity was done by students in groups. Cooperation was conducted to discuss and finish lecturing assignments. The average of cooperation activity in cycle 1 was 65.65 with highest and lowest score of 79 and 60 respectively. The average of downloading material activity in cycle 2 was 89.88 with highest and lowest score of 95 and 87 respectively. There was 36.92% improvement from cycle 1 to cycle 2. This cooperation activity improvement occurred because students previously did not understand e-learning, so that to use e-learning students required their mates’ helps in a learning group. Students altogether were motivated to explore virtual abilities to understand and use e-learning in their learning. Motivation for learning together in using e-learning improved, so that students learning material mastery improved (Sulisworo and Agustin, 2017). The motivation to progress together was more strengthening students’ learning behaviors, so that this cooperation activity also improved other learning activities.

4. Conclusion
Based on the research results, the conclusion is that learning implementation by using e-learning improves students’ online learning activities by 43.19%. Students are more skillful in doing online discussion, working online assignment, uploading and downloading files, and online cooperation. Suggestion; the researcher recommends educators to improve online learning activities and skills by using e-learning. In addition to face-to-face learning, e-learning can be utilized as media to help some non-face-to-face learning syntax. Students are trained in doing online activities and get used to use virtual networks in facing digital era of industry revolution 4.0.

Acknowledgment
This writing is one of learning products in the Universitas Muhammadiyah Metro, so that in this opportunity the authors want to express their deep gratitude to Rector of Universitas Muhammadiyah Metro who facilitated this research.
References

[1] Cahyani, R., Rustaman, N. Y., Arifin, M., Hendriani, Y. 2014. Kemampuan Kognisi, Kerja Ilmiah dan Sikap Mahasiswa Non IPA melalui Pembelajaran Inkuiri Berbantuan Multimedia. Jurnal Pendidikan IPA Indonesia. Online. https://journal.unnes.ac.id/nju/index.php/jpii/article/view/2894. Vol 3, No 1 (2014).

[2] Clark, R.C. and Richard E. Mayer. 2003. E-Learning and the Science of Instruction. San Francisco: Jossey-Bass/Pfeiffer.

[3] Dewi, N. R. Kannapiran, S., Wibowo, S. W. A. 2018. Development of Digital Storytelling-Based Science Teaching Materials to Improve Students’ Metacognitive Ability. Jurnal Pendidikan IPA Indonesia. Online. https://journal.unnes.ac.id/nju/index.php/jpii/article/view/12718. Vol 7, No 1 (2018).

[4] Donally, J. 2018. Learning Transported: Augmented, Virtual, and Mixed Reality for All Classrooms. Amazon Doucet, A., Evers, J., Guerra, E., Lopez, N., Soskil, M.,

[5] Timmers, K. 2018. Teaching in the Fourth Industrial Revolution: Standing at the Precipice. Routledge Global Teacher Prize.

[6] Jonassen, D.H. 2004. Handbook of Research on Educational Communications and Technology, Second Edition. New Jersey: Lawrence Erlbaum Associates Publisher.

[7] Martin, K. 2018. Learner-Centered Innovation: Spark Curiosity, Ignite Passion, and Unleash Genius. IM Press a Division of Burgess Consulting, Inc.

[8] Moma, L. 2017. Pengembangan Kemampuan Berpikir Kreatif dan Pemecahan Masalah Matematis Mahasiswa melalui Metode Diskusi. Jurnal Cakrawala Pendidikan. Online. https://journal.uny.ac.id/index.php/cp/article/view/10402. Februari 2017, Th. XXXVI, No. 1.

[9] Mufrihah, A. (2017). Treatment for Disruption of Smartphone Use in Learning Activity Through School-Wide Positive Behavior Support. GUIDENA: Jurnal Ilmu Pendidikan, Psikologi, Bimbingan dan Konseling, 7(1), 7-15. doi:http://dx.doi.org/10.24127/gdn.v7i1.677

[10] Mukhtar dan Iskandar. 2012. Desain Pembelajaran Berbasis TIK. Jakarta: Referensi.

[11] Rusman. 2012. Belajar dan Pembelajaran Berbasis Komputer. Bandung: Alfabeta.

[12] Schwab, K. 2017. The Fourth Industrial Revolution. Crown Business Press.

[13] Sulisworo, D., Agustin, S. P. 2017. Dampak Pembelajaran E-Learning terhadap Motivasi pada Pembelajaran Fisika di Sekolah Kejuruan. Berkala Fisika Indonesia. Volume 9 Nomor 1 Januari 2017.

[14] Sutrisno. 2012. Kreatif Mengembangkan Aktivitas Pembelajaran Berbasis TIK. Jakarta: Referensi.

[15] Wang, H. and D. L. Gearhart. 2006. Web-based Learning. New Jersey: PEARSON Merrill Prentice Hall.

[16] Wena, M. 2011. Strategi Pembelajaran Inovatif Kontemporer. Jakarta: Bumi Aksara.