Ubiquitous Learning Based on LMS Moodle to Improve Self-Regulated Learning

Sujarwo[1], Desy Safitri[2], Arita Marini,[3] Tubagus Ali Rachman Puja Kusuma[4]
[12]Social Science Education, Universitas Negeri Jakarta, Jakarta, Indonesia
[3]Elementary School Teacher Education, Universitas Negeri Jakarta, Jakarta, Indonesia
[4]Social Science Education, Institut Agama Islam Negeri, Metro, Indonesia
E-mail: *sujarwo-fis@unj.ac.id*

Abstract

Self-regulated learning (SRL) plays a pivotal role in fostering independent and lifelong learners. It empowers students to take control of their learning processes, enabling them to set goals, monitor their progress, and adapt strategies accordingly. Ubiquitous learning (U-Learning), on the other hand, emphasizes the seamless integration of learning experiences into everyday life through the pervasive presence of technology. This study aims to improve self-regulated learning and increase the learning independence of Universitas Negeri Jakarta students through ubiquitous learning based on the LMS Moodle. This study used a quantitative descriptive method, with the research subjects being 40 students of the social studies education program at Jakarta State University. In addition, Moodle is a powerful tool for implementing ubiquitous learning and improving self-regulated learning practices. By capitalizing on the platform's features and leveraging its potential, educators can create dynamic learning environments that empower students to take ownership of their learning journey. Future research and implementation studies should focus on exploring the effectiveness of Moodle-based ubiquitous learning strategies in diverse educational contexts to further enhance self-regulated learning outcomes.

Keywords: *Self-regulated learning, ubiquitous learning, LMS Moodle*

INTRODUCTION

The industrial revolution 4.0 has also encouraged a revolution in the field of education which is characterized by digital transformation in the field of education which is commonly referred to as Education 4.0 (Hussin, 2018). Although Information Communication Technology (ICT) has significantly improved education by assisting the teaching-learning process, there are still some obstacles to overcome and a number of areas that need to be improved, including formal education while working, lifelong learning, greater access to education for all, availability, connectivity, interaction, flexibility, mobility, removing barriers based on distance and time, availability of resources for distance learning, awareness of ICT use, and significant contents (Mathivanan dkk, 2021). Additionally, it can be difficult for teachers to comprehend the context of young people (sometimes referred to as millennials or digital natives because they may appear disengaged by technology and bored in a typical classroom (Diaz dkk, 2014). Consequently, educators should use novel techniques, new technologies, and even as well as increased appropriation for educational use (World Bank, 2014). Additionally, it can be difficult for teachers to comprehend the context of young people (sometimes referred to as millennials or digital natives) because they may appear disengaged by technology and bored in a typical classroom (Diaz dkk, 2014). In order to motivate their students, teachers should employ various techniques, adopt new technology, and even learn and use digital skills (Amhag dkk, 2019). So innovative learning is needed through ubiquitous learning (U-learning). The goal of ubiquitous learning is to accommodate students

and their learning styles by providing adequate information anytime and anywhere according to their needs and desires (Naatonis dkk, 2022).

U-learning is a broad concept that includes numerous methods that enable learning experiences tailored to the location, pace, and environment of each individual (Moreira dkk, 2017). U-learning is characterized as learning that is continuously available, stimulated, and supported in a variety of ways. The fact that u-learning is not confined to one location permits the expansion of learning experiences (Umam dkk, 2017). Students now have quicker and more accessible access to instructional resources. If the system can adjust to its context (user, platform, environment, device, etc.), then it is ubiquitous (Kanagarajan dkk, 2018). A learning ecosystem known as U-learning encourages or supports learning outside of the traditional classroom (El Guabassi dkk, 2018). It makes it easier to get the appropriate services whenever and wherever you are, thanks to the convergence of technology. In the most open and straightforward manner possible, these services give people a sense of ongoing learning and an incentive to learn about and engage with the environment in which they develop. the application of technology Networks of students, staff, and specialists engage both synchronously and asynchronously without relying on certain times and locations as part of learning, which aims to bring learning closer to where learners live (Moreno dkk, 2016). Ubiquitous learning enables full mobility while accessing educational resources and system customization for each student's computer environment. According to the literature, u-learning is generally understood to mean learning anything, anywhere, and at any time (Baez Perez, dkk, 2019). The teaching and learning process is the integration between learning activities by students and teaching by teachers. This means that students and teachers have their respective roles and functions. In this process, there is a transfer of knowledge from teachers to students. Ideally, students can accept any knowledge conveyed by the teacher. However, the reality is not that easy. Several factors influence the teaching and learning process, for example learning media, teacher methods in teaching, classroom conditions, and others. The use of ubiquitous in lectures is expected to increase understanding of course material as well as the use of u-learning is expected to increase student self-regulated learning.

Self-regulated learning is a state in which learners manage their own autonomous learning activities, keep track of their motivation and academic goals, manage their own human and material resources, and adopt behavior-based decision-making and implementation strategies (Al-Rawahi dkk, 2015). Self-regulated learning is the idea that a person can take control of their own learning processes. Self-regulated learning is the capacity to stimulate and support thought (cognition), emotion (affection), and action (actions) that have been planned and consistently directed toward learning a new skill (Panadero, 2017). Creating independent learning strategies is known as self-regulated learning. The idea that the learning process is not only concerned with teaching materials to students but also the process of how to learn teaching materials and how learning should incorporate self-regulation (self-regulation) is supported by modern learning concepts in education (Seufert, 2018).

Leading research shows that implementing U-learning involving cloud-supported TV and video platforms can increase student motivation and creativity (Lopez dkk, 2022). Relevant research related to problems on this topic aims to test the effectiveness of self-regulated learning in online learning to improve learning mastery during the Covid-19 pandemic (Ratnafuri dkk, 2020). Other research shows that

self-regulated learning has a significant effect on academic achievement.

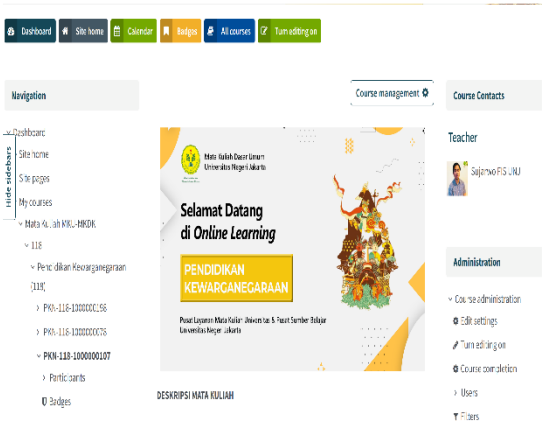
This study aimed to construct ubiquitous learning based on the LMS Moodle medium and investigate how it influenced students in courses in civic education at Universitas Negeri Jakarta. "Does the use of ubiquitous learning have a beneficial impact on student's academic performance?" was the core question in the study. The following questions will be addressed in this research: What is the effect of ubiquitous learning to improve self-regulated learning in class?

METHODS

This study used a quantitative descriptive method with 40 students as subjects who took the Citizenship Education course at Jakarta State University using the LMS Moodle. Data was collected using a self-regulated learning questionnaire with a Likert scale. Self-regulated learning indicators include cognitive strategies, motivational strategies, and behavioral strategies. The data were analyzed using descriptive statistics with very good, good, sufficient, poor, and insufficient categories.

RESULT AND DISCUSSION

Ubiquitous learning (U-Learning) in this study is Moodle-based. Moodle is a Learning Management System (LMS) or e-learning website-based software that can be used for teaching and learning purposes with the principles of social construction pedagogy (Neulborne dkk, 2020). The Moodle LMS has been developed at Jakarta State University to facilitate learning in the digital age. The LMS that has been developed can be accessed via the web or mobile with an internet connection so that students and teachers can study anytime and anywhere. The Moodle LMS contains various learning materials that can be included in accordance with learning objectives in the form of text, images, audio, and video and has test instruments to measure understanding of the teaching materials that have been studied.



Source: online learning unj

The Moodle LMS has been developed at Jakarta State University to facilitate learning in the digital age. The LMS that has been developed can be accessed via the web or mobile with an internet connection so that students and teachers can study anytime and anywhere. The Moodle LMS contains various learning materials that can be included in accordance with learning objectives in the form of text, images, audio, and video and has test instruments to measure understanding of the teaching materials that have been studied. By using Moodle-based U-learning, it is hoped that it can improve student self-regulated learning in the digital era.

The results of the ubiquitous learning (U-Learning)-based one LMS Moodle study on self-regulated learning of Jakarta State University students in terms of three indicators, namely indicators of cognitive strategies, motivational strategies, and behavioral strategies, The percentage of student self-regulated learning achievement is presented in Table 1.

Table 1. Percentage of Student Self-Regulated Learning Achievement For Each Indicator

Indicator	Percentage	Category
Cognitive Strategy	73 %	Adequate
Motivational Strategy	70 %	Adequate
Behavioral Strategy	72 %	Adequate

Table 1 shows all the indicators of self-regulated learning are in the adequate category. The percentage of achievement on cognitive indicators has the highest percentage level compared to indicators of motivational and behavioral strategies. Cognitive strategies are related to the efforts made by students to be able to learn and find information through U-Learning because they have the flexibility to study anytime and anywhere. Motivational strategies have sufficient categories, this is related to student efforts to foster enthusiasm within themselves to achieve planned learning goals (Rodrigues dkk, 2019). High motivation can encourage student-like behavior. Indicators of behavioral strategies are related to the efforts made when participating in learning and the efforts to seek help from others when encountering difficulties in learning (Puspita dkk, 2018). The achievement of behavioral strategies is influenced by learning motivation (Cleary dkk, 2015).

In addition to the data for each indicator from students' self-regulated learning after learning using U-Learning, an analysis was also carried out on the percentage of students in the citizenship education class using LMS Moodle (table 2).

Table 2. Percentage of Students in Each Category

Score	Category	Students	Percentage
86 – 100	Excellent	5	12,5 %
76 – 85	Good	21	52,5 %
60 – 75	Fair	10	25 %
55 – 59	Poor	4	10 %
≤ 54	Very Poor	0	0

Table 2 shows that students have a very good category of 12.5% (5 students). Students who are in the good category are 52.5% (21 students). While students who are in the sufficient category are 25% (10 students), 10% (4 students) are in the unfavorable category. When viewed from the perspective of the total percentage of students who attend citizenship education classes who have good self-regulation using Moodle LMS-based u-learning, although there are still students who have poor self-regulation, the percentage is small.

Self-regulated learning owned by students can affect student learning outcomes and their abilities in the world of work (Bransen dkk, 2020). This, of course, should be a concern for all teachers to be able to provide teaching by utilizing various digital learning platforms so that student self-regulation increases (Raaijmakers dkk, 2018). The use of Moodle LMS-based U-Learning in learning can be used as an alternative learning method in the digital era to increase student self-regulation (Perez, 2014). U-learning can train students to free themselves from dependence on the teacher so that they are used to making their own rules.

CONCLUSIONS

The conclusion of this study is that the use of Moodle LMS-based U-Learning can increase the self-regulated learning of Jakarta State University students in citizenship education classes. Students' self-regulated learning is in a good category. So that the use of Moodle LMS-based U-Learning can be a learning option that attracts funds that can be recognized by students anytime and anywhere so that they are able to increase SLR students and can free themselves from dependence on teachers.

RECOMMENDATION

Teachers and lecturers should be innovative and adaptive by developing learning

that is relevant to the development of digital technology. Moodle LMS can be used as a learning medium that can be used to facilitate learning anytime and anywhere in the digital era. Moodle as U-learning must be developed in an interesting and interactive way so that it can foster student self-regulated learning (SLR).

REFERENCES

Alemu, B. M. (2015). Integrating ICT into Teaching-learning Practices: Promise, Challenges and Future Directions of Higher Educational Institutes. *Universal journal of educational research*, *3*(3), 170-189.

Al-rawahi, NM, & Al-balushi, SM (2015). The Effect of Reflective Science Journal Writing on Students' Self-Regulated Learning Strategies. 10(3), 367–379.

Amhag, L., Hellström, L., & Stigmar, M. (2019). Teacher educators' use of digital tools and needs for digital competence in higher education. *Journal of Digital Learning in Teacher Education*, *35*(4), 203-220.

Báez Pérez and C. E. Clunie Beaufond. (2019). "Una mirada a la Educación Ubicua," RIED Rev. Iberoam. Educ. Distancia, Vol. 22, No. 1, Page. 325.

Bransen, D., Govaerts, M. J., Sluijsmans, D. M., & Driessen, E. W. (2020). Beyond the self: the role of co-regulation in medical students' self-regulated learning. *Medical Education*, *54*(3), 234-241.

Cleary, T. J., & Kitsantas, A. (2017). Motivation and self-regulated learning influences on middle school mathematics achievement. *School Psychology Review*, *46*(1), 88-107.

Diaz, J. and Rusu, C. (2014). Ubiquitous computer-supported collaborative learning: A literature review, Proceedings of Information Technology: New Generations (ITNG), 11th International Conference on, Page. 593-598.

El Guabassi, Z. Bousalem, M. Al Achhab, I. Jellouli, and B. E. EL Mohajir. (2018). "Personalized adaptive content system for context-aware ubiquitous learning," Procedia Comput. Sci., Vol. 127, Page. 444–453.

Hussin, Anealka Aziz. (2018). Education 4.0 Made Simple: Ideas For. Teaching. International Journal of Education & Literacy Studies, 6 (3).

Jiménez, M. E. (2015). Aprendizaje Invisible. Hacia una nueva ecología de la educación. *Revista Panamericana de Pedagogía*, (22).

Kanagarajan & Ramakrishnan. (2018). "Ubiquitous and ambient intelligence assisted learning environment infrastructures development - a review". Educ. Inf. Technol., Vol. 23, No. 1, Page. 569–598.

Liu, S. M., & Yuan, Q. (2015). The evolution of information and communication technology in public administration. *Public Administration and Development*, *35*(2), 140-151.

López M., G. A., Burgos, D., & Jiménez Builes, J. A. (2022). A Ubiquitous Learning Model for Education and Training Processes Supported by TV Everywhere Platforms. *International Journal of Emerging Technologies in Learning (iJET)*, *17*(11), pp. 128–145.

Mathivanan, S. K., Jayagopal, P., Ahmed, S., Manivannan, S. S., Kumar, P. J., Raja, K. T. & Prasad, R. G. (2021). Adoption of e-learning during lockdown in India. *International Journal of System Assurance Engineering and Management*.

Moreira, F., Mesquita, A., & Peres, P. (2017). Customized X-Learning environment: social networks & knowledge-sharing tools. *Procedia Computer Science*, *121*, 178-185.

Naatonis, R. N., Masitoh, S., & Nursalim, M. (2022). Perspectives On The Philosophy Of Education Progressivism in Learning Models Ubiquitous Learning. *FALASIFA: Jurnal Studi Keislaman*, *13*(02), 127-133.

Neto, F. M. M., de Carvalho Muniz, R., Burlamaqui, A. M. F., & de Souza, R. C. (2015). An agent-based approach for delivering educational contents through interactive digital TV in the context of T-learning. *International Journal of Distance Education Technologies (IJDET)*, *13*(2), 73-92.

Neulborne, M., & Elihami, E. (2020). Evaluation of

the XRecorder application via video on learning al-islam and muhammadiyah in the middle of the Covid-19 pandemic. *EduPsyCouns: Journal of Education, Psychology and Counseling*, *2*(2), 93-99.

Moreno Lopez, J. A. Jimenez Builes, and S. C. Bernal Villamil. (2016). "Overview of u-learning. Concepts, characteristics, uses, application scenarios and topics for research," IEEE Lat. Am. Trans., Vol. 14, No. 12, Page. 4792–4798.

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in psychology*, *8*, 422.

Puspita, S. A. L., & Rustika, I. M. (2018). The role of self-regulated learning and self-concept on the academic achievement of late adolescent students of the Faculty of Medicine, Udayana University who were once finalists in Bali Pageants. Jurnal Psikologi Udayana, 5(1), 1-11.

Raaijmakers, S. F., Baars, M., Paas, F., Van Merriënboer, J. J. G., & Van Gog, T. (2018). Training self-assessment and task-selection skills to foster Self-regulated learning: Do trained skills transfer across domains, Applied Cognitive Psychology, 32(2), 270–277.

Ratnafuri I & Muslihati. (2020). The effectiveness of self-regulated learning training in online learning to improve student learning mastery during the Covid-19 pandemic. Guidance and Counseling Seminar Proceedings, 16–22.

Rijal, S., & Bachtiar, S. (2015). The relationship between attitudes, learning independence, and learning styles with students' cognitive learning outcomes. Jurnal Bioedukatika, 3(2), 15.

Rodrigues, H., Almeida, F., Figueiredo, V., & Lopes, S. L. (2019). Tracking e-learning through published papers: A systematic review. *Computers & Education*, *136*, 87-98.

Seufert, T. (2018). The interplay between self-regulation in learning and cognitive load. *Educational Research Review*, *24*, 116-129.

Sun, J. C. Y., Chang, K. Y., & Chen, Y. H. (2015). GPS sensor-based mobile learning for English: an exploratory study on self-efficacy, self-regulation and student achievement. *Research and Practice in Technology Enhanced Learning*, *10*(1), 1-18.

The World Bank. Education for all (EFA) [online], [reviewed: April 17th, of 2014]. Available at: Available at: http://go.worldbank.org/I41DLBA8C0

Umam, S. N. S. Mardi, and M. Hariadi. (2017). "Ubiquitous learning model using interactive internet messenger group (IIMG) to improve engagement and behavior for the smart campus," J. Phys. Conf. Ser., Vol. 801, Page. 012083.

UNESCO. Las TIC en la educación [online], [reviewed: April 17th, of 2014]. Available at: Available at: http://www.unesco.org/new/es/unesco/themes/icts/

Utari, A., & Senen, S. H. (2018). The effect of self-regulated learning (SLR) on student achievement in economics subjects. SOSIO-DIDAKTIKA: Social Science Education Journal, 1(1), 8–14.

Wolters, C. A., & Hussain, M. (2015). Investigating grit and its relations with college students' self-regulated learning and academic achievement. *Metacognition and Learning*, *10*, 293-311.

World Bank. ICT and education - Key issues [Online], [reviewed: April 17th, of 2014]. Available from: http://www.worldbank.org/