

# **EFFECTIVENESS OF MICRO LEARNING BASED LEARNING IN LEARNING MANAGEMENT SYSTEM (LMS)**

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## Abstract

The transformation of learning towards digitalization demands a new strategy that is adaptive and efficient. This study aims to evaluate the effectiveness of micro-learning-based learning integrated into a learning management system (LMS). Micro-learning was chosen because of its ability to present material concisely and specifically, making it easier for students to understand the content gradually. This study was structured as a systematic review referring to the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines. The literature search process was carried out through the Google Scholar electronic database. The results of the identification of the effectiveness of micro-learning and the contribution of LMS to the effectiveness of micro-learning showed that micro-learning-based learning significantly improved learning outcomes and provided a more flexible and focused learning experience. Students also showed a high level of satisfaction with this learning model. This study provides evidence that microlearning in LMS can be an effective learning alternative, especially in the context of distance learning and independent learning.

## Keywords: learning effectiveness, micro learning, learning management system, students, distance learning

# Introduction

Along with technological advances and digital transformation, the world of education has also experienced significant changes, especially in terms of delivering learning materials. Anggriawan (2019) is a software designed to support various needs in the learning process. The learning management system (LMS) makes it easy for educators, both lecturers and teachers, to manage classes effectively, build interactions with students, and provide access to learning materials online according to the specified time period. LMS is software designed to support administration, reporting, documentation, automation, and delivery of all activities in the learning process (Ellis, 2009; Mahmudi et al., 2022). LMS is one of the main tools used to support online learning. Although LMS offers convenience in managing learning, one of the biggest challenges faced is how to increase the effectiveness of learning on this platform. In this context, micro learning emerges as a method that offers a solution to these challenges.

Micro learning is one of the innovative pedagogical approaches that is a learning process through small, welldesigned learning units and short-term learning activities (Senadheera et al., 2024). Micro learning The term "micro learning" generally describes learning in small doses, namely short training materials that can be understood in a short time (as opposed to the thick books that you used to have to read in school to learn a subject, or e-learning classes that are full of heavy content - which are classified as "macro learning") (Gherman et al., 2021). In its application in LMS, micro learning allows students to access learning content at any time, according to their needs, which increases their level of motivation and engagement in learning. Micro learning has emerged as a promising learning strategy to meet the learning needs of today's digital era, including in the development of learning materials. Micro learning presents complex information in small fragments or "chunks" of information (Wang & Yuan, 2023).

Several previous studies have shown that microlearning has great potential in increasing student engagement and learning effectiveness, especially in online learning environments that are often passive and less interesting. According to Pebriantika et al. (2024), it was found that microlearning offers various benefits, such as high flexibility, ease of learning for students, and contributes to improving learning outcomes. Microlearning is effective in increasing student engagement and has a positive effect on their knowledge and confidence when doing tasks (De Gagne et al., 2019). Mohammed et al. (2018) in their study of grade 7 at school found an 18% increase in student learning outcomes Publish by Radja Publika



with microlearning compared to learning without microlearning. Based on the results of this study, the effectiveness of microlearning-based learning in LMS can be a solution in learning to improve the quality of education. However, although micro learning has great potential in increasing the effectiveness of learning, there are many challenges that need to be faced. One of them is how to compile micro learning content that suits the needs and characteristics of students in Indonesia, and how the LMS platform can support this method optimally.

This study aims to evaluate whether the use of micro learning in LMS can improve student learning outcomes. This study is expected to provide significant contributions and serve as a new scientific basis in the field of educational technology in the use of micro learning in LMS. In addition, the results of this study can be used by educational developers to design more efficient learning methods that are in accordance with the needs of students, and can provide practical recommendations for educational policy makers in optimizing the use of LMS as a strategy for developing innovative learning in the future for the Indonesian nation.

# Method

This study was structured as a systematic review referring to the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines (Page et al., 2021). Inclusion criteria include: (1) Research evaluating the effectiveness of Microlearning in LMS learning; (2) Research with a quantitative approach with an experimental or quasi-experimental design; (3) Articles published in English between 2016 and 2024; (4) Articles published in Indonesian Journals between 2016 and 2024. Exclusion criteria include: (1) Research that does not evaluate the effectiveness of Microlearning in LMS learning; (2) Research with a quantitative approach with a non-experimental design; (3) Articles published in English before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024; (4) Articles published in Indonesian journals before 2016 or after 2024.

The literature search process was conducted through the Google Scholar electronic database using appropriate and relevant keywords. Search words include "learning effectiveness", "microlearning", "micro-learing", "micro-learing", "micro learning", "learning management system", "LMS", "educational content". The data obtained were extracted including study characteristics and main findings related to the effectiveness of micro learning in LMS. Study selection was conducted in two stages: (1) screening of titles and abstracts based on eligibility criteria; (2) assessment of article eligibility.

# Results

The results of the study on the effectiveness of micro-learning-based learning in LMS based on available research can be seen in table 1.1. Results of research on the use of micro-learning in learning.

No.	Writer	Research result
1.	Senadheera et al. (2024) in Impact of microlearning on academic performance of students in higher education: A systematic review and meta-analysis	The Meta-analysis method shows that the academic performance of students who study using the microlearning method (n = 344) is higher than that of students who study using the macro-learning method (n = 310) (p = 0.03). The overall average difference in post- test scores in the theory exam between the microlearning and macro-learning groups was 12.6 (95% CI: 1.24 - 23.9). This difference in value indicates that microlearning can provide significant improvements to students' academic performance compared to macro-learning. Microlearning can improve students' academic performance by reducing cognitive load, providing a flexible learning environment, encouraging self-directed learning, and providing timely feedback. Designing microlearning lessons based on adult learning principles (andragogy) can further strengthen the positive impact of microlearning on students' academic performance in higher education.
2.	Pebriantika et al. (2024) in the	Microlearning is a learning approach that presents material in small
	Effectiveness of Implementing	parts or on a limited scale. Although it has many advantages, this
	Microlearning Methods to Improve	method also has several limitations, such as limited material
	Student Learning Outcomes	coverage and is less suitable for complex topics that require in-

Table 1.1 Results of research on the use of micro learning in learning



depth explanations. However, microlearning provide benefits, such as high flexibility, ease in the learni students, and contribution to improving learning out Based on the results of the study, it is known that the value (Sig. 2-tailed) is 0.000, which is smaller than the limit of 0.005. With degrees of freedom (df) of 24, the is 2.064, while the t-count value is 13.779, which method the t-table. Therefore, it can be concluded that there is difference between the average pre-test and post- students. This finding indicates that the use of the method is effective in the learning process. In general, the progress of the industrial revol encouraged an increase in the quality of learning easier access, flexibility, and higher interactivity preparing students to face the dynamics and challeng evolving era.	es a number of ng process for tcomes. he significance he significance he t-table value neans t-count> s a significant -test scores of microlearning ution era has by providing y, while also ges of the ever-
3. Ghafar et al. (2023) in Microlearning Microlearning can be delivered through various	media in the
As a Learning Tool for Teaching and learning process, such as videos, applications, educ Learning in Acquiring Language: (gamification) infographics and social media plat	forms Several
Applications, Advantages, And studies have also revealed that this approach encour	rages students
Influences on the Language to learn by dividing the material into smaller seg	ments that are
easier to understand, thus supporting the smoo	thness of the
With its flexibility and easy integration into every	day activities.
microlearning allows students to learn whenever	and wherever
they need. This method is a fast and effective solution	on in mastering
new information or materials.	d such as the
limited amount of content available and the unsui	tability of this
method for complex materials or those requi	iring in-depth
explanation. Despite its limitations, microlearnin	ig remains an
thanks to its many advantages.	ning outcomes
On the other hand, the success of microlearning strat	tegies is highly
dependent on student characteristics, teachers' tende	encies in using
digital technology, and external factors such as the	availability of
4. Adnas (2022) in Design and Based on the research stages that have been carr	ied out in the
Development of Learning Paths in E- development of e-learning-based learning paths	with a micro-
Learning Using Micro-Learning learning approach in mathematics subjects, especi	ally the Three
Variable Linear Equation System (SPLTV) mater	rial, it can be
includes the introduction of basic concepts of SPLT	'V elimination
methods, substitution, determinants, and case stu	idies, can run
effectively and is feasible to be applied as an innov	vative learning
medium in the school environment.	L
feasibility level of 82.3% indicating that this learn	ing path meets
the feasibility standards for use in learning activitie	
the results of the practicality test showed a score of	.s. III addition,
	75.3% with the
category of "practical" without requiring revision,	75.3% with the which means



5.	Mohammed et al. (2018) in The	Based on the research findings, it can be concluded that the
	Effectiveness of Microlearning to	application of the microlearning method can improve students'
	Improve Students' Learning Ability	learning abilities by up to 18% compared to conventional learning
		methods. In addition, students showed high enthusiasm during the
		learning process and were motivated to gain further knowledge.
		These findings also indicate that microlearning contributes
		positively to information retention, by helping students store
		learning materials more effectively in long-term memory.

Based on the table, the extraction results can be stated as follows:

• Effectiveness of Micro Learning

Based on the results of the identified review, the effectiveness of micro-learning-based learning in LMS can be concluded that the use of micro-learning in learning in LMS can improve learning outcomes Senadheera et al. (2024). With a sample of 654 students divided into two groups, a learning group with micro-learning of 344 students and a group with non-micro-learning learning of 310 students. Mohammed et al. (2018) stated that micro-learning-based learning resulted in an increase in student learning outcomes of 18%. Overall, various studies show that micro-learning-based learning is effective in increasing student insight, skills, and activeness.

• LMS Contribution to Micro Learning Effectiveness

Based on the results of the identified review, LMS has a strategic role in supporting the successful implementation of micro-learning-based learning. As a digital platform designed to manage the online learning process, LMS provides a means that allows material to be delivered in the form of small, structured units, in accordance with the basic principles of micro-learning: concise, focused, and easily accessible. Based on research from Supiani et al. (2024) stated that with features such as module settings, interactive media, and tracking learning activities, LMS allows the presentation of material in small chunks that improve understanding and retention of information. The integration of video-based content, quizzes, and infographics also encourages active student involvement.

One of the strategic roles of LMS lies in its ability to provide flexibility to the learning process. Through features such as module management, automatic notifications, and access that can be done through various devices, students have the freedom to access learning materials anytime and anywhere. This level of flexibility is very relevant to the demands of today's learning that emphasizes time efficiency and the ability to learn independently. Furthermore (Ghafar et al. 2023) stated that LMS allows the integration of various forms of interactive media such as short videos, formative quizzes, infographics, and discussion forums that not only increase engagement but also gradually strengthen conceptual understanding. Presenting material in small segments also helps reduce cognitive load, as stated in the cognitive load theory, thus facilitating the process of internalizing knowledge.

In addition to the content delivery aspect, LMS also provides significant contributions in terms of monitoring and evaluation. The analytics and learning activity tracking features allow educators to measure the effectiveness of each micro learning module, identify learner difficulties, and make more adaptive learning strategy adjustments.

However, the effectiveness of LMS in supporting micro learning is highly dependent on the quality of content design, readiness of technology infrastructure, and user competence, both educators and students in utilizing the LMS optimally. Thus, solid collaboration is needed between technology developers, instructional designers, and educational institutions to ensure that the implementation of micro learning can provide real contributions to improving the quality of the learning process and outcomes.

# Discussion

This study aims to assess the potential effectiveness of micro-learning-based learning in LMS. Based on the results of the review identified based on scientific articles and journals, it shows that the use of micro-learning in LMS shows positive results in increasing learning effectiveness, student engagement, and material retention. Micro-learning, which presents content in small pieces that can be learned in a short time, has proven to be a relevant approach to meet the demands of modern learning that requires flexibility and time efficiency. Research shows that students who participate in micro-learning-based learning experience significant improvements in their ability to remember and understand material, compared to those who participate in conventional learning. This finding is in line with the cognitive load theory which states that information presented in small chunks is easier for the brain to



process, which in turn supports increased understanding in the long term. In the context of learning outcomes, LMSbased micro learning can improve the effectiveness of the teaching and learning process in higher education. The use of LMS that allows the integration of various forms of media—video, text, and quizzes—in small modules allows students to access more relevant and in-depth materials. This study also indicates that learning using LMS with a micro learning approach has a positive impact on students' academic achievement, because this method allows them to learn independently and follow a learning rhythm that suits their respective abilities.

However, some challenges in implementing micro learning in LMS are also found. The main challenge lies in the limited number of competent human resources in making micro learning and as LMS operators, limited access to technology and inequality of accessibility in some areas, especially in remote areas. Therefore, although micro learning offers many advantages, its success is highly dependent on external factors such as technological infrastructure and the ability of users to optimally utilize LMS. Overall, the implementation of micro learning in LMS has great potential to improve the quality of learning, by shortening learning time, increasing student engagement, and improving retention of the material learned. However, to achieve optimal results, further efforts are needed to overcome technical challenges and provide adequate support for all parties involved.

## Conclusion

Micro-learning-based learning integrated into LMS has proven effective in improving learning outcomes, engagement, and student satisfaction. This method presents material in a concise and specific format, making it easier to understand and retain information. The results of quantitative research using the PRIMA method showed that the group implementing micro-learning showed a significant increase in learning outcomes compared to the group following conventional learning methods.

*Micro learning* also provides flexibility and enables self-directed learning, which is particularly relevant in the context of distance learning. Despite challenges such as limited human resources and technological infrastructure, microlearning can generally be an effective and efficient learning solution in today's digital era, especially when supported by thorough content planning and adequate technical support.

## Suggestion

Based on the research that has been conducted, the recommendations that the author can provide are:

- 1. Improving HR competency: Training and mentoring are needed for teachers, lecturers, and LMS operators so that they are able to design and manage micro-learning-based learning optimally.
- 2. Developing Targeted Micro Learning Content: Educators and content developers need to develop micro learning materials that are appropriate to the needs and characteristics of students in Indonesia, taking into account the level of material complexity and diverse learning styles.
- 3. Improving Technology Infrastructure: The government and educational institutions need to ensure equal access to technology, especially in 3T (remote, frontier, and outermost) areas, so that all students can benefit from micro-learning-based learning.
- 4. Continuous Evaluation and Development: Educational institutions need to conduct regular evaluations of the effectiveness of micro learning implementation, as well as develop learning systems that are adaptive to changes in technology and student needs.

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