Microlearning in Mathematics Learning

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Abstract. This study aims to determine how to use Microlearning in learning Mathematics. Mathematics is a subject that contains material on numbers, formulas and structures, shapes and spaces and their magnitudes and changes. This is what makes students find it difficult to learn mathematics. Therefore, we need a learning media that can represent all objects in mathematics in a simple and interesting way. Microlearning objects are expected to be the answer to existing problems because Microlearning objects have characteristics that are simple, specific, interesting, easy to distribute, easy to use and integrated with the internet or social media that students have loved. This study uses mlibrary study method. The results obtained based on various sources are known that microlearning is very useful in delivering mathematics material, mathematics learning becomes more fun, the time used is more effective and students are happy and looking forward to the presence of mathematics lessons in class.

Keywords: Microlearning, Learning, Mathematics.

1 Introduction

Education in Indonesia is divided into several stages, namely early childhood education, basic education (9 years of compulsory education), secondary education and higher education. By going through all stages of this education, it is hoped that all Indonesian children can achieve their goals in the future. But it is not an easy thing to create. Many factors influence so that many Indonesian children cannot complete all stages of education in Indonesia. One of them is the lack of interest in children to go to school[1], low motivation for children to go to school[2] and environmental factors[3].Therefore, special attention is needed to be able to solve this problem so that all Indonesian children can complete all stages of education in Indonesia for the progress of the Indonesian nation and state in the future. Indonesia's progress is in the hands of the nation's children. Therefore, an effort is needed to minimize the problem of these school dropouts.

The cause of children not completing their education level is due to low interest and motivation of children. Motivation is a basic movement that triggers activities in this case learning, while

interest is how much desire a student has to get maximum learning[4].Furthermore, also stated that motivation plays an important role in moving interest in learning so that students who have high motivation will have a positive impact on their learning outcomes. There are several solutions to increasing students' motivation and interest in learning, including creating a fun learning atmosphere, providing clear instructions, creating a threat-free classroom environment, changing the learning atmosphere, applying varied learning models and methods, creating positive competition, giving rewards, giving responsibility to students, enthusiasm, getting to know students more deeply, providing feedback and helping find solutions, track progress, make class fun, provide opportunities to do and use varied learning media[5].

Based on this explanation, one way that can foster student motivation and interest is to use a variety of learning media. Varied media here means using various types of media in displaying or delivering subject matter. Micro learning is one that can apply a variety of media. Because microlearning is a small-scale learning method where content is designed into small segments through a variety of media formats so that the available information becomes "short content" which allows someone to quickly understand the content and makes it possible to learn anywhere and anytime through technological devices, information, and communication[6]. Microlearning can present material in various types of formats, including podcasts, PowerPoint slides, infographics, motion graphics, explainer videos, as well as interactive video conferencing and gamification[7]. It is hoped that with the use of these varied media, students can be interested so that they can increase their interest and motivation in learning.

2 Method

This research was conducted through a descriptive qualitative approach. Research activities are carried out by analyzing various literatures related to the analysis of learning needs. Literature search was conducted on indexed books and journals. Data collection techniques were carried out using literature studies (documents). The data analysis technique used is descriptive analysis by reducing data, presenting data, drawing conclusions and verify.

3 Result and Discussion

3.1 Result

3.1.1 Data Reduction

The beginning of the research was carried out by reducing the data. Data reduction is the stage of simplifying and selecting data according to needs. In this study, researchers chose indexed journals relevant to this research, namely those related to Microlearning in Mathematics learning. From this stage, the researcher has collected and selected several relevant journals and is considered to be able to contribute to research knowing how to use Microlearning in learning Mathematics. These journals are:

Table 1. List of Journals.

No	Journal Name	Index	Title	Year
1	International Journal of Development Research	Bielefeld Academic Search Engine (BASE), Microsoft Academic Search, Google Scholar	Use of microlearning as a strategy to teach mathematics asynchronously	2021
2	Journal of Hospitality & Tourism Research	Scopus	Microlearning: A New Learning Model	2020
3	Conference: International Educational Technology Conference At: Harvard, Cambridge, MA	Harvard University, Cambridge, USA	Microlearning: A Pedagogical Approach For Technology Integration	2017
4	Research, Society and Development	BASE Google Scholar	Microlearning as a new techno-pedagogical approach: A new	2022
5	The Electronic Journal of e-Learning (EJEL)	Scopus	Designing Mini-Games as Micro-Learning Resources for Professional Development in Multi-Cultural organizations	2021
6	Multimedia Tools and Applications An International Journal	Springer	Integrating micro-learning content in traditional learning platforms	2020
7	Journal of Dairy Science	Scopus	Short communication: Microlearning courses are effective at increasing the feelings of confidence and accuracy in the work of dairy personnel	2019
8	Indonesian Journal of Educational Research and Review (IJERR)	Sinta 2	The Development of Learning Video Based on Micro-Learning Principle Towards Science Subject in Junior High School	2021
9	JINOTEP (Journal of Learning Technology Innovation)	Copernicus	Microlearning as an effort to deal with the impact of the pandemic on the process Learning	2021

3.1.2 Data Presentation

The following is a presentation of the contents of the journal that discusses Microlearning in Mathematics learning.

Table 2. Journal Discussion

No	Author and Title	Method	Destination	Results
1	Mateus-Nieves, Enrique and Edwin Moreno Moreno[8] Use of microlearning as a strategy to teach mathematics asynchronously	Qualitative approach with two theoretical axes: • The levels of covariational reasoning proposed by (Carlson et al., 2003), • Technologically mediated by a Virtual Adaptive Learning Environment	Innovate on learning mathematics using microlearning.	With microlearning-based development students can communicate effectively, can use micro-information to learn more efficiently.
2	Mary Jo Dolasinksi, Joel Reynolds Microlearning: A New Learning Model[9]	Descriptive	The aim of this article was to propose a new learning model that integrates performance workflow and microlearning.	Microlearning is an approach that focuses on a single concept, utilizing multisensory and multimodality in a focused short amount of time. It can be easily incorporated into the job workflow.
3	Emtinan Alqurashi Microlearning: A Pedagogical Approach For Technology Integration[10]	Literature review	This paper discusses the main three elements in creating an effective microlearning environment, which are: content pedagogy, and technology. It explores the knowledge of how carefully-selected content can be a successful element in microlearning	Micro learning (ie content, pedagogy, and technology), can increase student engagement, increase student satisfaction, and have a positive impact on the learning experience.
4	Ederval Pablo Ferreira da Cruz, et.al Microlearning as a new techno-pedagogical approach: A review[11]	Literature review	conduct a literature review that discusses various aspects of micro learning, introduces motivation, presents its main concepts, relationships with other e-learning concepts.	There is still a lot that needs to be researched more deeply regarding formal education that uses Microlearning.
5	Sylvester Arnab, et.al Designing Mini-Games as Micro-	Case study	Explore the use of mini-games as a source of micro-learning	Through the survey, it is known that the mini-games developed can be a source of fun learning and

No	Author / Title	Method	Purpose	Result
	Learning Resources for Professional Development in Multi-Cultural Organizations[12]			support online learning platforms.
6	Rebeca Diaz Redondo, et.al Integrating micro-learning content in traditional e-learning platforms[13]		offer new technologies in training and add micro learning content to distance learning	The combination of LTI (Learning Tools Interoperability) and LIS (Learning Information Service) enables data exchange with LMS to monitor student activity learning outcomes.
7	A. Hesse, et.al Short communication: Microlearning courses are effective at increasing the feelings of confidence and accuracy in the work of dairy personnel[14]	Qualitative	See how employees react after conducting training with Microlearning.	Overall, 78% of employees feel more confident in completing tasks correctly after training
8	I Made Chandra Adhipertama, et.al The Development of Learning Video Based on Micro-Learning Principle Towards Science Subject in Junior High School[15]	ADDIE models	analyze and develop learning video products based on microlearning principles in science subjects.	Micro-learning principle-based learning videos are included in very good qualifications and deserve to be implemented as a support for learning activities to form more interesting and fun activities.
9	Hafsah Nugraha, et.al Microlearning as an Effort in Dealing with the Impact of the Pandemic on the Process Learning[16]	observation and literature study.	examine the format of microlearning media that used in college.	College has potential to develop microlearning teaching materials in various formats such as (1) podcasts, (2) PowerPoint slides, (3) infographics, (4) motion graphics, (5) videos explainer, and (6) interactive video conferencing and gamification, as a form of innovation in the learning process

3.1.3 Conclusion and Verification

After collecting data through literature studies of several journals, it is found that there are still few researchers who conduct research on Microlearning, especially in learning Mathematics. Of the nine indexed journals, there are seven journals related to the learning process. Among them are the development of learning and the use of microlearning in learning. However, from the nine journals that have been selected, no one has conducted research focusing on Microlearning in Mathematics learning. Many journals describe the results related to training developed based on Microlearning.

3.2 Discussion

Microlearning can be defined in several ways, including:

- Microlearning is an innovation in presenting material, where content is presented in a concise and focused manner so that it is easy to remember and easily accessible to make it more productive[17]

- Microlearning can be interpreted as micro learning, which is a way of delivering units of knowledge in small or short sizes so that students can adjust their learning abilities[18].

- Micro learning is a variety of ways that are poured briefly in order to make micro content delivered well[19]

From the definition mentioned above, it appears that Microlearning is an effective alternative through presenting material. The material here is information or knowledge that will be conveyed to participants.

In this research, the researcher aims to see how Microlearning implements Mathematics learning. Why do researchers want to link Microlearning with Mathematics learning? It is known together that mathematics is a subject that has been given from early school children to university. But its existence is enough to make students restless with its existence. Students often consider Mathematics as one of the difficult subjects[20]. Many factors make students think that mathematics is a difficult and boring subject, and one of them is the way teachers teach it's not appropriate[21].

Based on this explanation, it appears that there is a positive relationship between Mathematics Learning carried out by applying Microlearning. This can be seen from the results of the research that has been described previously, namely from the results of research conducted by[22]. His research found that by developing microlearning-based learning, students can communicate effectively, and can use micro-information to learn Mathematics more efficiently[23].

However, based on nine indexed journals that the researchers searched for related to microlearning, only one focused on discussing its relation to learning Mathematics. Likewise, when research looks for microlearning journals related to learning Mathematics, there are not many studies that discuss this. Most found are Microlearning related to training, how to work effectively on a micro basis, development of microlearning content, and development of Microlearning in science lessons. Researchers find it difficult to find Microlearning journal articles on Mathematics learninger.
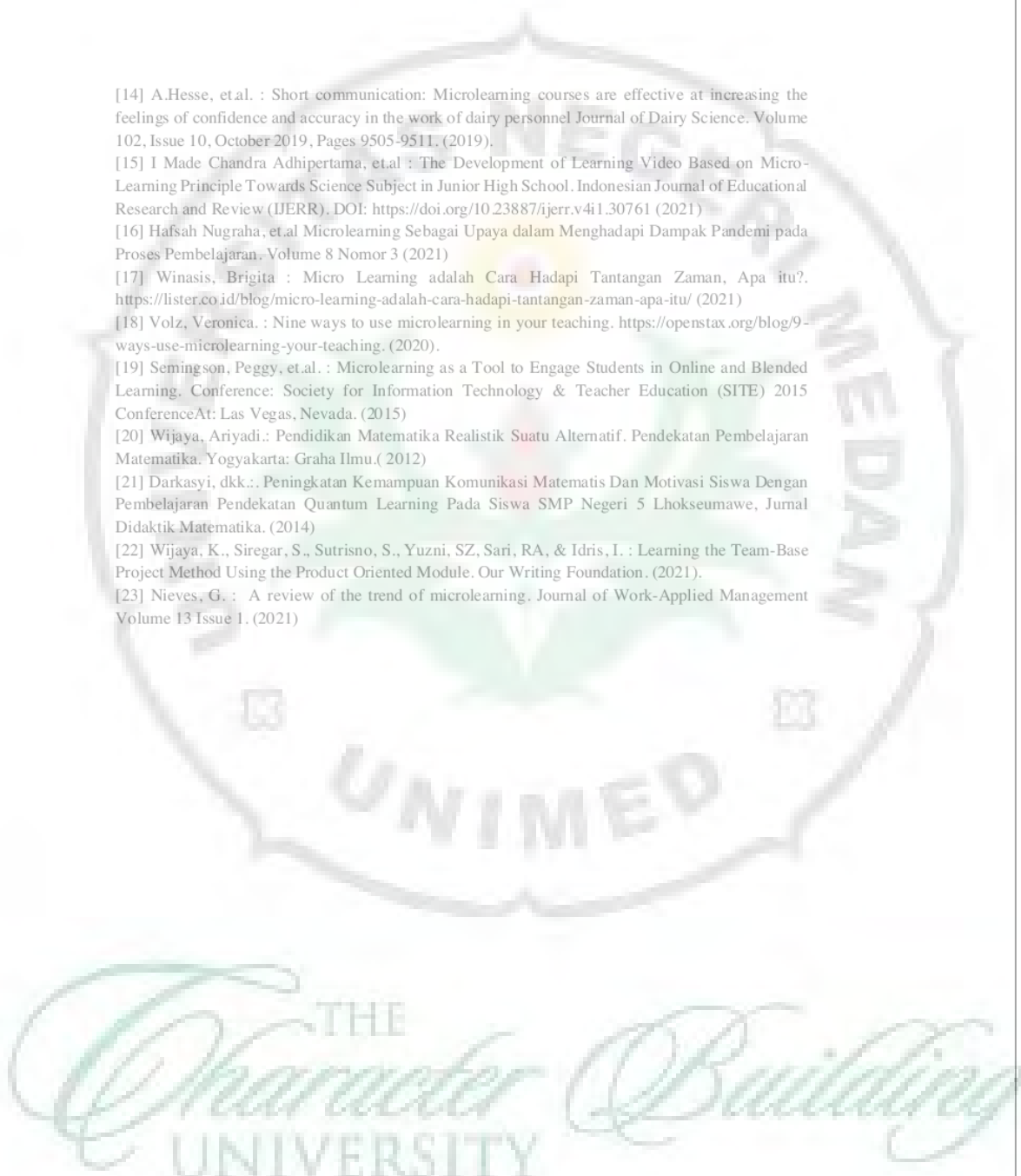
4 Conclusion

Based on the description of the previous discussion, it can be concluded that Microlearning is a breakthrough that can be used as a way to deal with this technological age. With Microlearning, material content can be made into smaller parts. Where this can make the delivery of material more effective. In addition, the material content is packaged in various applications, making it easier for users to learn it anywhere and anytime. The use of Microlearning itself is very broad. Can be used in the fields of training, education, health and others. However, based on several journals that have been read by researchers, it does not appear that many have thoroughly researched Microlearning in mathematics learning.

Suggestions that What can be given to further researchers is to be able to research more and more deeply related to Microlearning in Mathematics learning. This is important considering the benefits that can be generated when using Microlearning in delivering material.

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