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How Developing and Implementation Microlearning in Educational Setting? : A Literature Review

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Abstract: The use of microlearning can help students to focus more on the learning process. Thus, this article aims to analyze various studies related to microlearning in educational institution from 2019 to 2023. The method used in this research is literature review. The literature review method is used identify and interpret microlearning research available in educational settings. The focus is to analyze how microlearning is developed and implemented in educational institutional. The results of this study indicate that the use of the development model does not determine the success of the microlearning product developed and the success of the learning process and improving student achievement is not solely influenced by microlearning, but also influenced by factor outside microlearning. Likewise, the duration of microlearning implementation can be adjusted to the learning objectives to be achieved.

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Introduction

The weak focus of students when learning is a crucial problem today. One of the characteristics of today's learners is that they cannot focus on learning for a long period of time (Herdian et al., 2023). The condition coincides with the characteristics of generation Z who are easily bored, like something instant and multitasking. This fact is strongly supported by the percentage of students at this time which is dominated by generation Z and a big challenge for teachers and learning instructional to create teaching that increases learners' focus.

The fundamental assertion that learners will be more focused in learning if information is presented in small units and learning is designed in smaller steps and microlearning offers that concept. However, microlearning is a new sector in education as it has been mostly focused on enterprise and training. But lately, the trend of microlearning is quite frequent and popular in the field of education, especially online. Microlearning is often equated with microteaching, even though the two concepts are different even though they are used in the same setting, namely education and learning. Microlearning is a short-term learning strategy that can increase student interest in learning (Haryanti et al., 2023; Herdian et al., 2023). In line with this statement (Haryanti et al., 2023) mentioned microlearning is a learning media innovation that divides learning content into small and short segments. The presentation of microlearning-

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based learning media can be presented in digital form as long as the content is still presented in a short duration and topic.

Microlearning is an innovative approach that will accelerate digitization in teaching, attract students, and combine technology and education (Sahin & Kırmızıgül, 2023). Microlearning also offers an answer to the issue of the influence of learning time, making time for learning is an important element for learning and knowledge acquisition, where productive time management is one of the factors for success and qualifications for individuals and organizations (Elpina & Haris, 2023). Through the development of sophisticated technology, it certainly facilitates the learning process with the concept of microlearning. In the process of designing learning content, micro-learning can be implemented to solve the problem of long learning duration. Microlearning is one form of evolution in online learning and can be considered as an innovative approach to 21st century digital learning. Based on the description above, microlearning has several advantages, namely (1) better retention of the concept of microlearning, (2) better engagement of learners in learning, (3) increase learner motivation, and learners are able to engage in collaborative learning, and (5) can improve the learning ability and performance of learners (Marti & Ariani, 2023).

This article aims to analyze how microlearning is developed and implemented in educational institutions. With the hope that it can be utilized by several parties who need relevant information. For educational units, this research can be used as a reference in developing microlearning and implementing the right one in accordance with learning objectives. On the other hand, for further researchers, this study can be utilized as supporting research literature. For this reason, the focus of discussion in this study is what development models are chosen and used to develop microlearning? What are the products developed with microlearning? How is the implementation process of microlearning in educational institutions? How long is the duration of microlearning implementation to determine its effect on learning?

Research Method

A literature review was conducted to examine microlearning in educational institutions. This synthesis review focused on microlearning-based learning, so only articles that provided original and empirical meta analyses were selected. The keywords used in the search were the following terms: microlearning, micro-learning, microlearning and performance, bite size learning, microlearning in the workplace, microlearning and adult learning, microlearning and adult education. The search was conducted in Goole Scholar, Crossref, Harzing's academic, OpenAlex, PubMed. The researcher narrowed the focus by only articles published from 2019 to 2023 will be selected with sinta, scopus, springer, eliser, DOAJ journals. Furthermore, to minimize bias at this stage, the electronic search was not narrowed down and subsequent literacy was done manually. Most of the literature is classified in the development and implementation of microlearning in educational institutions. As the focus of this study was to analyze the implementation of microlearning in educational institutions, 14 articles were selected that met the requirements for synthesis review. The inclusion criteria that the researcher applied were international and national level articles, originating from well-defined journals, article publication within the last 10 years, experimental, qualitative, and developmental research types. The purpose of this study is to analyze the types of research models that are often used in the development of microlearning and the implementation of

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microlearning in educational institutions, as a reference material for future researchers when developing microlearning. The findings can serve as a reference for the education sector, government and academia to promote, design and use microlearning.

Result and Discussion

Technological advances have contributed greatly to the development of the global industry, including in the realm education. Many studies have been conducted related to the development and implementation of microlearning in educational setting. Detailed results based on keywords are shown in table 1 and table 2.

Table 1. Review of Research Results "Development Microlearning in Educational Setting"

Author	Domain of Knowledge	Microlearning Component	Development Research Model	Key Finding
(Adhipertama et al., 2020)	Science	Video	*ADDIE (Analysis, Design, Development, Implementation, Evaluation)*	Learning video based on microlearning improves learning outcomes of students in junior high school.
(Dana et al., 2023)	English	Video	*SAM (Successive Approximation Model)*	Microlearning-Based English Video Materials help teachers and students in the learning process, especially grade 8 students.
(Setiada et al., 2022)	Science	Video	*4D (Define, Design, Development, Dissemination)*	The results of this study indicate that microlearning learning media can be used in the learning process and get a positive response from students.
(Simanjuntak & Haris, 2023)	Mathematical	Modules	*ADDIE (Analysis, Design, Development, Implementation, Evaluation)*	The learning module developed using the microlearning method improves the mathematical

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				literacy skills of VII grade junior high school students.
(Mardiana et al., 2023)	English lexicogrammar	Podcast, audiobook, interactive games	*DDR (Design and Development Research) – preparation, iterative design, iterative development*	Lexicogrammar Microlearning-Based Materials Infused With Listening Skills provides an opportunity for learners to study the material in a focused manner and in a short time, according to their own learning rhythm.
(Elpina & Haris, 2023)	Two Variable Linear Equation System (SPLDV)	Flipbook	*ADDIE (Analysis, Design, Development, Implementation, Evaluation)*	Microlearning-based learning modules in flipbooks on the material of the system of equations of two variables are effective based on the results of student learning completeness.
(Ariantini et al., 2019)	English	Animation	*ADDIE (Analysis, Design, Development, Implementation, Evaluation)*	Microlearning-based learning animation is highly qualified and effective in improving students' English learning outcomes.
(Rafli & Adri, 2022)	Entrepreneurship	Infografis, modul hypercontent	*ADDIE (Analysis, Design, Development, Implementation, Evaluation)*	The development of microlearning makes the entrepreneurship course more interesting. interesting and increase the attractiveness of

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				student learning towards entrepreneurship courses.
(Marti & Ariani, 2023)	Base Data	Microvideo	*Lee & Owens (Analyze, Design, Development, Implementation, Evalution)*	Microvideo has appropriate qualifications and meets the feasibility in terms of media and materials developed.
(Noriska et al., 2021)	Diffusion of Educational Innovations	Slides, animated videos, infographics	*SAM (Successive Approximation Model)*	The development results show that the microlearning developed in this study can facilitate students to learn the Diffusion of Educational Innovation course.

Table 2. Review of Research Results "Implementation Microlearning in Educational Setting"

Author	Country	Duration of Implementation	Key Finding
(Calixtro, 2023)	Philippines	8 weeks	Students' academic performance improved after the implementation of microlearning based lesson in grade 9 chemistry learning
(Galarosa & A.Tan, 2022)	Philippines	14 days	Microlearning Approach Via Cybergogy Learning Environment has the potential to improve students' academic achievement.
(Kholidya et al., 2023)	Indonesia	Not explained	Online learning materials based on microlearning can effectively improve student learning outcomes in curriculum evaluation and development courses in the Department of Educational Technology.
(Sahin & Kırmızıgül, 2023)	Turkey	3 weeks	There was an increase in success of 76% of students in the development of procedural knowledge, so it was concluded that microlearning can be used in mathematics lessons.

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Development Microlearning in Educational Setting

Research utilizing the ADDIE model to develop learning videos using microlearning techniques has been conducted (Adhipertama et al., 2020). Their research targeted science subjects in junior high schools (SMP) to captivate students' interest and enhance learning. The results indicated that learning videos based on microlearning principles were of high quality and effective as supplementary educational tools to make learning more engaging and enjoyable. Similarly, (Dana et al., 2023) developed three English language video materials using microlearning, integrating three teaching models: problem-based learning, project-based learning, and discovery-based learning. Their study employed the Successive Approximation Model (SAM) by Allen (2012), which involves phases of preparation, iteration, and repeated development. Then, (Mardiana et al., 2023) research focused on creating English lexicogrammar materials with microlearning for junior high school students, especially 7th graders. Their findings revealed that lexicogrammar materials based on microlearning, combined with listening skills, allowed students to learn targeted content efficiently and according to their learning pace.

The SAM model was applied in research by (Dana et al., 2023) and (Noriska et al., 2021). The choice of the SAM model is based on the fact that this model is considered more efficient in terms of time and has clearer steps in each phase than the ADDIE model (Dana et al., 2023). In contrast, (Noriska et al., 2021) did not provide specific reasons for their choice but mentioned using the Dick and Carey model stages while developing the product with the SAM model. Some of the products developed using the SAM model are slides, animated videos, infographics.

Two podcasts, one audiobook, and some interactive games in integration with listening skills are products developed by (Mardiana et al., 2023) by incorporating microlearning for junior high school students. Their research aimed to improve students' understanding of lexico-grammatical concepts through microlearning. The lexicogrammar learning materials were designed as microlearning media objects incorporating listening skills. On the other hand, (Adhipertama et al., 2020; Dana et al., 2023; Marti & Ariani, 2023; Setiada et al., 2022) learning videos in their respective studies. The content areas combined with microlearning were mostly science for (Adhipertama et al., 2020) and (Setiada et al., 2022), while (Marti & Ariani, 2023) and (Dana et al., 2023) focused on databases and English. Although these four studies produced similar microlearning products, they employed different development models, including the ADDIE model, SAM model, 4D model, and Lee & Owens model.

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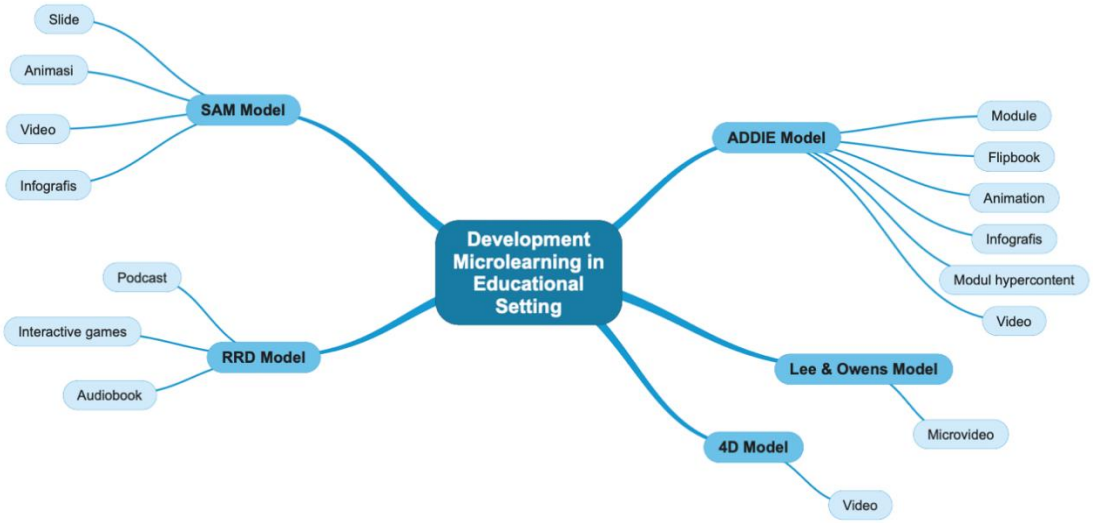

Figure 1. Distribution of development models and microlearning products

Based on the analysis of the articles by (Adhipertama et al., 2020; Ariantini et al., 2019; Elpina & Haris, 2023; Simanjuntak & Haris, 2023), there is a commonality in the use of the ADDIE model for developing microlearning. In contrast, (Dana et al., 2023; Mardiana et al., 2023; Setiada et al., 2022) employed the SAM, 4D, and DDR models for their microlearning development. Explicitly (Dana et al., 2023) stated that the SAM model is more effective for developing microlearning compared to the ADDIE model. However, there is no significant influence between the use of the chosen development model and the resulting microlearning product. This can be seen from the similarity of the microlearning products produced, despite using different development models.

Implementation Microlearning in Educational Setting

The implementation of microlearning with a focus on improving student learning outcomes is the goal of the research conducted by (Kholidya et al., 2023). This is based on the lack of students' attention to the understanding of learning materials and the abundant availability of materials makes them not focus on the intended material. Significant to the desired goal, the study (Kholidya et al., 2023) successfully showed that online learning materials based on microlearning provided a significant improvement in students' learning outcomes. Microlearning provides freedom to learners in determining their learning time. The use of microlearning makes learners can avoid boredom when they learn so that they are more focused on achieving learning outcomes. Therefore, (Calixtro, 2023) voiced that learners perform better when they use microlearing in learning Chemistry.

While implementing microlearning in an educational setting, (Calixtro, 2023; Galarosa & A.Tan, 2022; Sahin & Kırmızıgül, 2023) used different way to assess the effectiveness of microlearning on the desired variables. Reseach (Calixtro, 2023) focused on the academic performance of 18 Grade 9 students in an online learning modality. The research instrument used by (Calixtro, 2023) was a pretest-posttest based on the Most Essential Learning Competency (MELC) learning outcomes, consisting of 25 multiple-choice items covering Grade 9 Chemistry topics during the second quarter of the 2020-2021 academic year.

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When reviewed from the duration of implementation, (Calixtro, 2023) implemented microlearning with a longer duration of 8 weeks and found that there was an increase in students' Academic performance after the implementation of microlearning based lessons in grade 9 chemistry learning. Furthermore, (Sahin & Kırmızıgül, 2023) implemented microlearning with a duration of 3 weeks and proved that there was an increase in success by 76% of students in developing procedural knowledge, so it was concluded that microlearning could be used in learning mathematics. This finding is similar to (Galarosa & A.Tan, 2022) that Microlearning Approach Via Cybergogy Learning Environment has the potential to improve students' academic achievement. However, they only need 14 days to see the effectiveness of the applied microlearning. Meanwhile, (Kholidya et al., 2023) does not explain how long it takes to implement microlearning.

So, referring to the analysis that has been done, it is concluded that the duration of microlearning implementation can be adjusted to the learning objectives to be achieved. However, to determine the effectiveness of microlearning implementation in learning, a minimum implementation duration of about 14 days or 2-3 meetings is needed. In fact, a related article found that the longest duration of microlearning implementation is 8 weeks. However, studies related to the duration of implementation need to be reviewed in relation to the variables to be examined.

Conclusion

Referring to the findings of the analyzed research, it was found that the use of the development model does not determine the success of the developed microlearning product. This can be seen from the similarity of microlearning products produced, despite using different development models. In line with this, the effectiveness of the application of microlearning in the learning process is not entirely influenced by the duration of implementation. Learning objectives and learners' initial conditions can also affect the effectiveness of the application of microlearning in educational settings.

Furthermore, it should be noted that the success of the learning process and improving learner achievement is not only influenced by microlearning, but also influenced by factors outside microlearning such as teacher quality, learning models used, learning environment, and learner motivation. Then, the duration of microlearning can be adjusted according to the learning objectives to be achieved. Based on that, it is necessary to combine the use of microlearning with other supporting factors so that an effective and efficient learning process can be achieved and learner learning outcomes can be achieved optimally.

Recommendation

Based on the results of this study, suggestion for future research include: 1) comparison of the effectiveness between the types of microlearning products used in learning 2) comparison of the effectiveness of the application of microlearning at each level of education, elementary school, junior high school, high school and college. The above is important to do so that research can be used in a broader realm.

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