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Transforming Educational Paradigms: How Micro Learning Shapes Student Understanding, Retention, and Motivation?

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ABSTRAK

Micro learning adalah pendekatan pembelajaran yang semakin relevan di era digital, mengutamakan informasi dalam potongan kecil seperti video pendek, infografis, atau kuis interaktif untuk meningkatkan pemahaman, retensi pengetahuan, keterlibatan, dan motivasi siswa. Penelitian sebelumnya menunjukkan efektivitas micro learning dalam berbagai konteks seperti pendidikan tinggi, pelatihan korporat, dan pengembangan profesional. Namun, ada tantangan dalam mendefinisikan dan mengukur efektivitasnya serta dampaknya terhadap hasil belajar siswa. Penelitian ini bertujuan menganalisis tinjauan sistematis literatur (SLR) untuk memahami lebih holistik efektivitas micro learning dan faktor-faktor yang mempengaruhinya. Penelitian ini termasuk ke dalam penelitian kualitatif dengan menggunakan metode SLR. Penelitian ini menggunakan metode pengumpulan data berupa observasi sistematis. Pada penelitian ini melibatkan 23 artikel yang memenuhi syarat. Setelah data dikumpulkan, kemudian dianalisis menggunakan metode teknik analisis data deskriptif kualitatif. Hasil dsari berbagai referensi yang diberikan, gambaran umum literatur yang ditemukan tentang pembelajaran mikro mencakup berbagai topik dan aplikasi yang relevan. Sehingga, dapat disimpulkan bahwa, Pembelajaran mikro telah menunjukkan keefektifannya dalam meningkatkan pemahaman konsep dan kemampuan siswa untuk mempertahankan pengetahuan di beberapa bidang pendidikan. Dengan demikian, penelitian ini diharapkan memberikan wawasan lebih dalam tentang potensi dan strategi micro learning yang efektif dalam berbagai konteks pendidikan.

ABSTRACT

Microlearning is an increasingly relevant approach to learning in the digital age, prioritizing information in small chunks such as short videos, infographics, or interactive quizzes to improve student understanding, knowledge retention, engagement, and motivation. Previous research shows the effectiveness of microlearning in various contexts, such as higher education, corporate training, and professional development. However, there are challenges in defining and measuring its effectiveness and its impact on student learning outcomes. This study aims to analyze a systematic literature review (SLR) to understand the efficacy of microlearning and its influencing factors more holistically. This study is a qualitative research using the SLR method. This study used a data collection method in the form of systematic observation. This study involved 23 eligible articles. After the data was collected, it was analyzed using the qualitative descriptive data analysis technique. As a result of the various references provided, the overview of the literature found on microlearning covers a wide range of relevant topics and applications. Thus, it can be concluded that microlearning has demonstrated its effectiveness in improving students' understanding of concepts and ability to retain knowledge in several areas of education. Thus, this research will provide deeper insights into the potential and effective micro-learning strategies in various educational contexts.

1. INTRODUCTION

In an era where information is easily accessible through digital devices, micro learning has become an increasingly relevant and important learning approach. Microlearning is a learning strategy that prioritizes the delivery of information in small, easily digestible pieces, usually in the form of digital content

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such as short videos, infographics, or interactive quizzes. This approach aims to present the learning material in a brief and focused manner, allowing students to acquire new knowledge in a short time and are accessible whenever they need it. Thus, microlearning offers a high degree of flexibility and accessibility, which fits the fast lifestyle and high mobility in today's digital age. Micro learning, or microlearning, is a new paradigm in the world of education characterized by a learning approach that focuses on delivering information in small pieces that are easily understood by students. In micro learning, students have direct access to the lesson material. Micro learning is done using technologies such as interactive quizzes, infographics, and short videos to deliver lessons.

The emergence of microlearning in the field of education can be attributed to various factors. First, the increasing integration of technology into education has paved the way for innovative learning approaches, including microlearning, to increase student engagement and knowledge retention. With the development of digital technologies such as the Internet, computers, and mobile devices, there is a growing interest in finding learning approaches that are more flexible and responsive to change. Second, the shift towards a personal and adaptive learning experience has prompted educators to explore microlearning as a means of meeting individual learning styles and preferences. Moreover, the need for sustained professional development and skills improvement in a changing job market has made microlearning a valuable tool to deliver targeted and appropriate training, both for educators and students (Gagne et al., 2019; Karlsen et al., 2023; Zolfaghari et al., 2023). Microlearning meets those needs by providing easy access and learning materials available in short formats, enabling individuals to quickly develop their skills according to current needs.

Microlearning involves the acquisition of knowledge in small, focused segments that require a solid understanding of concepts as a foundation for critical thinking and problem-solving. A strong understanding of this concept becomes a key element in guiding students to mastery in a field of science in accordance with the goals desired by society, religion, and state. Problem-based learning models, such as the Problem-Based Learning Model (PBM), are developed to support students in understanding concepts, developing problem-solving skills, and enhancing their independence through situations or simulations similar to real-world situations. Thus, students can develop independence and expertise in solving problems effectively (Hall et al., 2004; Rejemiati et al., 2022). Although there is a lot of research that has been done on micro-learning, such literature often has certain limitations and challenges. One of the major challenges is the lack of consistency in defining and measuring the effectiveness of micro learning. Many studies use different approaches and metrics, making it difficult to compare findings and generalize them. Moreover, many studies tend to overfocus on the technical aspects and implementation of micro learning, without paying adequate attention to their impact on student learning outcomes. Therefore, there is a need for more comprehensive and structured research to gain a more holistic understanding of the effectiveness of micro-learning and the factors that influence it.

Previous systematic literature reviews have explored various aspects of microlearning. A review in 2021 focused on mobile microlearning and its implications, which studied the usability, systematic review, and human-computer interaction associated with mobile microlearning. The findings from this review explain the cellular implications of microlearning in educational settings. Additionally, a 2022 bibliometric analysis examines the effectiveness of microlearning as an instructional strategy across higher education, corporate training, and K-12 teacher professional development. Additionally, in 2021, the research examined a conceptual framework for programming skills development based on microlearning and automated source code evaluation in virtual learning environments, highlighting how adaptive learning systems can address challenges in programming education. This study enhanced our understanding of the role of microlearning in developing programming skills. Additionally, in 2021, another study addressed Microlearning and Computer-Supported Collaborative Learning: An Agenda Towards a Comprehensive Online Learning System, which emphasized the need for further research into the theoretical and systematic instructional underpinnings of microlearning (Garshasbi et al., 2021; Lee et al., 2021; Sankaranarayanan et al., 2023; Skalka et al., 2021).

Research in higher education has extensively examined the impact of microlearning on learning performance. Recent studies from 2021 and 2024 have focused on evaluating the effectiveness of these approaches and their influence on student learning outcomes in the context of higher learning. Additionally, a study was conducted to investigate the efficacy of app-based digital microlearning in improving the competency of elderly care personnel. Another study aimed to assess the need, effectiveness, and areas of applicability of this approach in improving staff competencies in aged care settings.. This study offers a valuable understanding of the utilization of digital micro-learning in competency development programs (Al-Zahrani, 2024; Dolasinski & Reynolds, 2023; Richardson et al., 2023; Sathiyaseelan et al., 2024).

The problem identified in this research highlights the necessity of evaluating several critical factors to determine the effectiveness of a learning process. One key factor is having a deep understanding of

concepts and the ability to retain knowledge. It is essential that this understanding allows knowledge to be applied in various situations, going beyond mere memorization to include the application and analysis of concepts. The importance of understanding concepts in depth is crucial for knowledge to be applied in different situations. Evaluation of this understanding should be more than just memorizing, but should also include the application and analysis of concepts. Another indicator of effective learning is student involvement in the learning process. Research has shown a significant relationship between student academic engagement and academic achievement, particularly in terms of cognitive engagement, behavioral engagement, and sense of belonging. This suggests that higher levels of student engagement are closely linked to better academic outcomes (Bransford et al., 2000; Furo & Abbey, 2020).

Accommodating diverse learning styles and unique student needs is crucial for effective learning (Roberson et al., 2024; Rogerson & Rossetto, 2018; Troussas et al., 2021). By integrating various teaching methods tailored to different cognitive skills, educators can enhance student learning outcomes and retention rates. Understanding visual, auditory, and kinesthetic preferences can enhance student engagement and comprehension Understanding students' preferred learning styles, such as visual, auditory, and kinesthetic approaches, can significantly enhance their comprehension and retention of information (Scarino, 2022; Wang & Han, 2021). Understanding the impact of learning on student motivation and interests is crucial for sustained academic success. Research indicates that motivational variables, such as self-efficacy, interest in a scientific career, and relevance of learning to personal goals, significantly influence emotions and engagement in science studies. Additionally, autonomy-supportive teaching motivations and intrinsic student motivation positively correlate with student engagement in online learning environments. Interest, as a powerful motivational process, energizes learning and contributes to academic success by guiding academic trajectories and enhancing engagement (Li et al., 2022; Membiela et al., 2023).

Overall, evaluating the effectiveness of learning can be done by looking at how well students understand the concept, how much they are involved in learning, to what extent learning activities accommodate diverse learning styles, as well as their impact on student motivation and interests. The study aims to investigate the effectiveness of microlearning in improving student learning outcomes in various educational contexts. The paper addresses several key questions regarding the effectiveness and implications of micro learning in education. Firstly, it examines whether micro learning effectively enhances students' understanding of concepts and their retention of knowledge. Secondly, it explores the extent to which micro learning can bolster student involvement in the learning process. Additionally, the paper investigates how micro learning can adapt to diverse learning styles and cater to individual student needs. Moreover, it delves into whether the implementation of micro learning positively impacts student motivation and fosters their interest in learning. Lastly, the paper scrutinizes the factors that influence the effectiveness of micro learning and proposes effective strategies for its implementation across various educational contexts.

2. METHOD

This research is included in qualitative research using the Systematic Literature Review (SLR) method. Systematic Literature Review (SLR) is a methodological approach used to gather, evaluate, and synthesize existing research on a particular topic. SLR allows researchers to systematically identify, select, analyze, and interpret relevant literature to answer research questions or specific goals in a particular field of study. The PRISMA method plays an important role in identifying relevant and high-quality studies to be included in the SLR in education. By following the PRISMA guidelines, researchers can ensure a comprehensive and transparent study selection process, improving the quality and reliability of the SLR (Mahmud et al., 2022; Mohamed Shaffril et al., 2021). The search strategy involved using databases and search keywords. Scopus was used to ensure that studies were comprehensively collected. The last search was completed on March 23, 2024. Sets of keywords were applied as search terms: "microlearning" AND "effectiveness" OR "efficacy" OR "impact" OR "evaluation" OR "assessment." The study identified inclusion and exclusion criteria according to the study goal. Inclusion criteria required that articles involve both concepts of "microlearning" and "effectiveness." Exclusion criteria included articles written in a language other than English, book chapters, textbooks, handbooks, reports, dissertations, study proposals, discussion forums, trade magazines, and articles only available in abstract form (i.e., lacking full text). The data collection method used is systematic observation.

The article selection process involved five key steps: initial search and identification, screening, eligibility, quality assessment, and final article selection. Quality assessment, as highlighted by Bano et al. (2018), was a crucial aspect to ensure that the systematic literature review (SLR) effectively addressed the research questions. For inclusion in the study, articles identified through the SLR had to meet specific

criteria, including providing clear research objectives, describing participants' characteristics, detailing research settings, and meeting other predefined requirements (Arsyad & Zainil, 2023; Su et al., 2023; Wee & Banister, 2023). This rigorous selection process aimed to ensure that only relevant and high-quality articles were included in the study, enhancing the credibility and validity of the systematic literature review. A total of 23 articles qualified to move on to final article selection step for further analysis, detailing how data was collected, data sources, and methods of data analysis. After the data is collected, it is then analyzed using the qualitative descriptive data analysis technique method. The article selection process is presented in Figure 1.

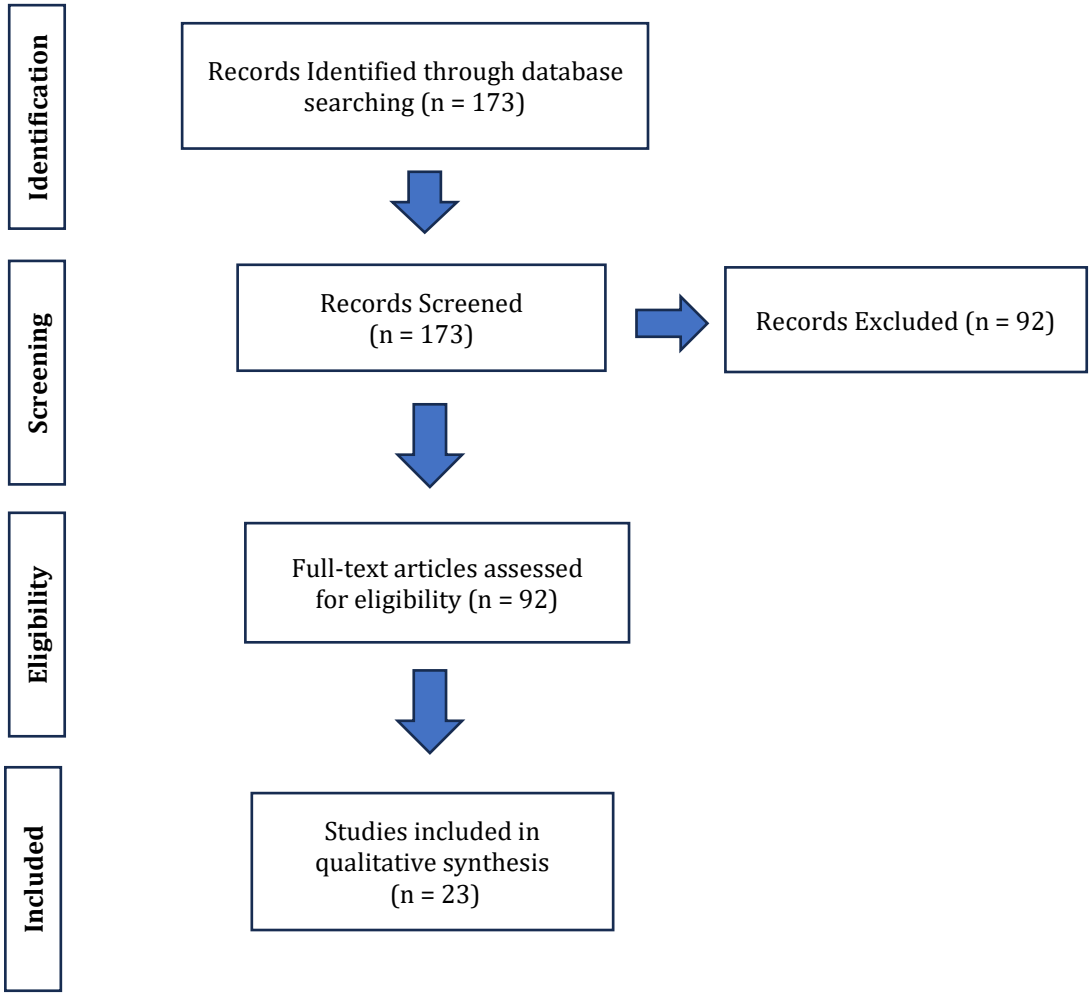

Figure 1. Article Selection Process

3. RESULT AND DISCUSSION

Result

Outcome From the various references provided, a general overview of the literature found about microlearning covers a wide range of relevant topics and applications. Several studies have resulted from this research. First, a study by the first researcher evaluated the effectiveness of micro-learning in enhancing knowledge acquisition and skill development, particularly in the context of patient safety and surgical education. The second explored the effectiveness of developing psychological capital through microlearning interventions, emphasizing its positive impact on employee efficiency and well-being. The third researcher, focusing on the effects of micro-learning on nursing students, demonstrated improvements in self-efficacy and learning outcomes, particularly in medical education settings. The fourth researcher discussed the effectiveness of multimodal microlearning strategies for teacher training and the importance of mobile microlearning, emphasizing the importance of diverse learning resources and their usefulness for enhancing the learning experience. The fifth researcher, exploring international collaborative learning through microlearning to strengthen creativity, highlighted the role of microlearning in facilitating

collaborative and creative learning experiences. The sixth investigated the impact of interactive training and micro-learning approaches on medical students' motivation and self-directed learning during the COVID-19 pandemic, emphasizing the role of interactive strategies in increasing motivation and engagement. The last researcher discussed micro-learning and computer-based collaborative learning, highlighting the importance of comprehensive online learning systems and transformative learning experiences in professional development (Garshasbi et al., 2021; Lee et al., 2021; Puah et al., 2022; Richardson et al., 2023; Romanenko et al., 2023; Romero-Rodríguez et al., 2023; Sankaranarayanan et al., 2023).

Research has demonstrated the efficacy of microlearning in improving students' comprehension of concepts and long-term retention of information. Multiple research have examined this matter, revealing favorable results. A study conducted on nursing students found that microlearning has a good effect on learning and self-efficacy. This suggests that brief and focused learning sessions might enhance students' confidence and understanding in specific subjects. Moreover, a study conducted on surgical interns has shown that micro learning modules are extremely advantageous in improving the acquisition of knowledge, especially in specialized fields like surgery. Furthermore, studies conducted to assess the efficacy of microlearning in higher education have yielded useful findings on its capacity to improve academic learning outcomes. This study provides valuable insights into the effects of microlearning on student performance in higher education by specifically examining post-test control groups. A further study, which focused on patient safety and staff resource management training in medical settings, demonstrates the capacity of microlearning to effectively convey crucial knowledge, even in situations where time is limited and the stakes are high (Gross et al., 2019; Ichiuji et al., 2022; Sathiyaseelan et al., 2024; Zarshenas et al., 2022).

Microlearning has gained considerable attention in the domain of increasing student engagement in the learning process. Recent research has investigated the use of TikTok in college settings and has discovered that it effectively enhances student engagement and satisfaction with the content produced. Furthermore, studies on the utilization of interactive training and microlearning during the COVID-19 pandemic have shown that it is effective in enhancing the motivation and self-learning abilities of medical students. This highlights its influence on student engagement in the educational setting. In addition, a study examining the effectiveness of 15-minute Crew Resource Management training as a type of microlearning for patient safety highlighted the importance of feedback in improving student involvement. A recent study on mobile microlearning emphasized the importance of user experience in improving learning efficacy, leading to increased student engagement (Conde-Caballero et al., 2024; Gross et al., 2019; Lee et al., 2021; Sözmen et al., 2023).

Microlearning has the capacity to effectively cater to different learning styles and meet the specific demands of individual students. Studies have proven that online and micro delivery techniques are highly effective in developing psychological capital, benefiting individual pupils to a substantial degree. Furthermore, research on the theoretical framework for cultivating programming proficiency through micro learning has demonstrated that this method may be customized to suit the distinct requirements and preferred learning methods of students. Studies have demonstrated that utilizing 15-minute Crew Resource Management training as a method of micro learning for patient safety can effectively customize the learning experience to suit the specific needs of individual students (Carter & Youssef-Morgan, 2022; Gross et al., 2019; Skalka et al., 2021). Moreover, research on the design of microlearning for mobile devices has demonstrated that this method improves the effectiveness of learning and the overall learning experience, indicating that it may be tailored to meet the individual requirements of students. Furthermore, research has demonstrated the effectiveness of multimodal microlearning in the context of ongoing teacher training, indicating that this method may be customized to meet the individual needs of each student. Studies on the engagement of employed individuals in micro learning indicate that this method can be customized to suit individual inclinations and requirements (Allela et al., 2020; Lee et al., 2021; Puah et al., 2022).

Micro learning has been shown to positively impact student motivation and interest in learning. Research on the effectiveness of interactive training approaches and micro learning during the COVID-19 pandemic found that these methods enhanced the motivation and self-learning of medical students. Furthermore, the implementation of micro-learning interventions to cultivate psychological capital indicates that this method has the potential to greatly enhance student motivation. ((Carter & Youssef-Morgan, 2022; Sözmen et al., 2023). Studies on the use of 15-minute Crew Resource Management training as a micro learning technique for patient safety have shown that breaking down learning into smaller segments can increase student motivation (Gross et al., 2019). Furthermore, examination of learners' profiles in micro-learning applications for the purpose of developing language feedback skills indicates that this method can have a beneficial impact on student motivation. The use of micro learning as a method for teaching soft skills to university students has been shown to enhance student motivation and interest

(Gorham et al., 2023; Romanenko et al., 2023). Consequently, various studies indicate that micro learning can positively boost students' motivation and engagement in the learning process.

Factors that influence the efficiency of micro learning include various aspects that can affect learning outcomes in an educational context. One key factor is the delivery mode of learning, whether it's face-to-face or online. In addition, the duration and format of the micro learning intervention also plays an important role in its effectiveness. The design of interactive and multimodal micro learning modules is also considered important for enhancing motivation and self-learning. Integration of micro learning with other teaching methods, such as computer-supported collaborative learning, can also contribute to creating comprehensive online learning systems (Carter & Youssef-Morgan, 2022; Garshasbi et al., 2021; Lee et al., 2021; Sözmen et al., 2023).

Besides, the characteristics and needs of the students are also important factors in the effectiveness of micro learning. Analysis of student profile and adaptation of micro learning content to individual needs can improve learning outcomes. Understanding the intentions of working adults to participate in micro-learning, as learned through the theory of planned behavior, can provide insights in promoting engagement and participation. In the context of professional development, micro learning has proven to be effective in improving certain skills, such as soft skills for university students. In addition, the use of micro learning has also been shown to be beneficial in improving patient safety through focused short training sessions. The use of micro learning in various educational settings, such as the training of future teachers, has also shown promising results in monitoring and evaluating student activity (Gorham et al., 2023; Gross et al., 2019; Javorcik et al., 2023; Puah et al., 2022; Romanenko et al., 2023).

Effective strategies for implementing microlearning in a variety of educational contexts can be based on findings from several related journals. Here are some strategies that can be applied: 1) designing interactive and multimodal micro learning modules can enhance the motivation and self-learning of pupils. Integrating interactive elements such as quizzes, short videos, or simulations can improve pupils' involvement in the learning process; 2) choosing appropriate delivery modes, such as through a mobile application, can affect the effectiveness of micro learning. 3) Analyzing student profiles and adapting micro learning content to individual needs can improve learning outcomes. By understanding student characteristics, micro learning modules can be adapted to optimal learning outputs; 4) Integrating micro learning with other learning methods, such as collaborative learning, can create a holistic learning experience. A combination of different learning approaches can improve overall learning effectiveness; 5) Conducting continuous monitoring and evaluation of student activity in micro learning (Garshasbi et al., 2021; Gorham et al., 2023; Javorcik et al., 2023; Lee et al., 2021). By understanding the level of participation and understanding of student participants, educators can make the necessary adjustments to improve learning efficiency.

Discussion

Microlearning discussions have become a significant approach in modern education, providing brief and focused learning activities that can be easily integrated into a variety of educational contexts. Microlearning is defined as an activity-oriented method that conveys learning content in small, well-managed units, often by adding interactive elements to enhance engagement. This approach is valuable in addressing the diverse needs of learners by providing flexibility in terms of time, location, and content delivery (Richardson et al., 2023; Skalka et al., 2021). Mobile Microlearning, as a subset of this methodology, is characterized by its short duration and its ability to adapt, enabling learners to engage with educational content wherever they are. Research have demonstrated a positive correlation between the utilization of microlearning and enhanced learning performance as well as higher knowledge retention among participants. Furthermore, microlearning has demonstrated its efficacy in enhancing learning results across different domains, including the enhancement of soft skills training for university students, improvement of patient safety training in healthcare environments, and the advancement of professional development for educators. Microlearning has been demonstrated to effectively improve motivation and self-directed learning, particularly in difficult circumstances like the COVID-19 pandemic (Gorham et al., 2023; Gross et al., 2019; Pölzl-Stefanec & Geißler, 2022; Romanenko et al., 2023; Sathiyaseelan et al., 2024; Sözmen et al., 2023).

Furthermore, research has investigated the influence of microlearning on particular cohorts, such as nursing students, revealing favorable effects on both learning achievements and self-efficacy. icrolearning's implementation in higher education has been examined in several scenarios, such as the enhancement of programming abilities, ongoing teacher education, and collaborative international learning opportunities (Allela et al., 2020; Puah et al., 2022; Romero-Rodríguez et al., 2023; Zarshenas et al., 2022). Furthermore, studies have examined the determinants that impact an individual's inclination to participate in microlearning, emphasizing the significance of attitudes, social norms, and perceived behavioral control.

Enhancing student engagement and fostering learning motivation. Enhancing Learning and Improving Retention of Knowledge Research has demonstrated that microlearning has a beneficial effect on learning and the retention of knowledge across different educational settings. Studies indicate that microlearning delivers educational material in concise and carefully designed modules, frequently using mobile applications, without necessitating prolonged student focus. Research has shown that this technique enhances learning efficacy and improves learning experiences, resulting in higher knowledge retention (Lee et al., 2021; Skalka et al., 2021). Furthermore, the utilization of microlearning is linked to enhanced learning efficacy and heightened knowledge retention among participants.

Research has demonstrated the efficacy of microlearning in enhancing learning outcomes across different domains, including the development of soft skills among university students, training for patient safety in healthcare environments, and professional growth for educators. The utilization of microlearning methods has been demonstrated to have a beneficial effect on motivation and self-directed learning, particularly in difficult circumstances like the COVID-19 epidemic. Moreover, studies have demonstrated that microlearning can significantly enhance self-efficacy and learning results in targeted populations, such as nursing students. The investigation of microlearning integration in higher education has transpired across diverse domains, encompassing collaborative international learning experiences, the enhancement of programming skills, and ongoing teacher training. The study also highlighted the significance of assessing the design and delivery of microlearning modules in order to enhance their efficacy. Furthermore, the implementation of Flipped Mobile-Based Microlearning (FMM) has been proven to enhance accessibility, engagement, information retention, the overall learning experience, and the academic accomplishment of graduate students (Al-Zahrani, 2024; Sathiyaseelan et al., 2024).

Microlearning has demonstrated a strong capacity to adjust to individual needs and preferences in the learning process, highlighting its flexibility and adaptability. Microlearning provides concise and organized educational material in small increments, typically delivered through a mobile app. This enables students to learn at their own convenience, using their preferred devices and in settings of their choosing. The Flipped Mobile-Based Microlearning (FMM) approach also shows positive effects in improving accessibility, engagement, knowledge retention, overall learning experience, and graduate student academic achievement (Al-Zahrani, 2024; Richardson et al., 2023). Research has demonstrated that microlearning is applicable in diverse learning settings, including the enhancement of programming skills in virtual environments, the provision of soft skills training for students, and the implementation of patient safety training in healthcare environments. Furthermore, microlearning has demonstrated efficacy in enhancing motivation and self-directed learning, particularly under difficult circumstances like the COVID-19 pandemic (Gross et al., 2019; Romanenko et al., 2023; Skalka et al., 2021; Sözmen et al., 2023). Microlearning offers students the flexibility to study based on their own needs, without being restricted by limitations of time and location.

The flexibility of microlearning in higher education can be seen in its application in different scenarios, including teacher training within the department, collaborative international learning experiences, and professional skills development for early childhood educators. These studies highlight the significance of creating and providing efficient microlearning modules to ensure that these methods can be customized to suit the requirements and preferences of students (Allela et al., 2020; Pölzl-Stefanec & Geißler, 2022; Romero-Rodríguez et al., 2023; Sankaranarayanan et al., 2023). Microlearning offers both learning flexibility and adaptability in diverse educational settings. Microlearning has demonstrated its efficacy as a versatile and adaptable learning method that can cater to individual requirements and preferences during the learning process. Strategies for doing something successfully in order to properly use microlearning, it is advisable to explore various methodologies that are supported by relevant research. A currently under evaluation strategy is the Flipped Mobile-Based Microlearning (FMM) method, which has lately been examination in research investigations. This approach has the capacity to improve accessibility, engagement, information retention, the overall learning experience, and academic accomplishment among graduate students. Moreover, the utilization of interactive and easily accessible digital platforms like TikTok has demonstrated effectiveness in the implementation of microlearning (Conde-Caballero et al., 2024; Sathiyaseelan et al., 2024; Skalka et al., 2021).

Additionally, in order to develop a comprehensive online learning system, it is critical to consider the integration of microlearning and computer-supported collaborative learning. Furthermore, highlighting the efficacy of interactive training and microlearning techniques in enhancing motivation and self-directed learning can also form the basis for successful implementation strategies. It has the potential to facilitate the development of an all-encompassing online learning platform. Additionally, it is worth considering the implementation of effective mobile microlearning designs as a valuable technique for incorporating microlearning. Ensure that these designs have the potential to enhance the effectiveness and experience of student learning. In addition, focusing on minute increments (micro-steps) during online professional

development can serve as a productive approach in effectively incorporating microlearning (Garshasbi et al., 2021; Lee et al., 2021; Pölzl-Stefanec & Geißler, 2022; Sözmen et al., 2023).

The implementation of microlearning methodologies has brought about substantial changes in the field of education. Extensive research has demonstrated that microlearning has a beneficial influence on enhancing learning efficacy, student engagement, and flexibility to various learning requirements. Through the use of suitable implementation strategies, educational institutions can maximize the potential of microlearning to generate more efficient and impactful learning experiences. While our comprehension of microlearning has advanced, there are still unexplored areas that require further investigation to further our understanding. Further research might explore the impact of microlearning on student learning motivation, including examining how microlearning influences both intrinsic and extrinsic motivation, as well as identifying the elements that affect student motivation. Furthermore, it is imperative to examine the potential integration of microlearning with other pedagogical approaches, such as project-based or collaborative learning. Furthermore, it necessitates an examination of the efficacy of different platforms and technologies employed in microlearning. This study aims to evaluate the effectiveness of several platforms in terms of delivering educational content, promoting student involvement, and aiding knowledge retention. Additionally, future research can investigate the impact of microlearning on other student populations, such as those with special needs, high-achieving kids, or students from diverse backgrounds.

This study aims to uncover successful tactics and techniques in microlearning that can cater to the specific learning needs and preferences of these target groups. Ultimately, the research can prioritize the development and assessment of the design of efficient microlearning modules. This study aims to investigate the impact of interactive, responsive, and adaptive designs on student learning effectiveness and engagement. By enhancing our comprehension of this field, we can optimize the capacity of microlearning to facilitate efficient and all-encompassing learning in diverse educational settings. In general, the research outcomes offer significant perspectives on the capacity of microlearning to enhance educational engagement and efficacy. By comprehending and implementing these discoveries, educators and institutions can efficiently utilize the advantages of microlearning to generate more captivating and influential learning experiences for students.

4. CONCLUSION

The main issues about the efficacy and ramifications of microlearning in education have been successfully tackled by the research, to sum up. By doing a thorough examination of pertinent research, it becomes clear that microlearning has a beneficial influence on multiple facets of the learning process. Microlearning has demonstrated its effectiveness in improving students' comprehension of concepts and their ability to retain knowledge in several educational fields. Research has shown positive results in enhancing academic performance, self-confidence, and the acquisition of skills among students. Furthermore, microlearning has arisen as a significant instrument for enhancing student engagement in the learning process. Studies suggest that the implementation of microlearning techniques, such as utilizing interactive platforms like TikTok, has resulted in higher levels of student involvement and contentment with educational materials. Additionally, microlearning shows flexibility in meeting the demands of each unique learner and a range of learning methods. Research has demonstrated the efficacy of online and micro delivery methods in meeting the unique needs of students, therefore improving their learning experiences.

5. REFERENCES

Al-Zahrani, A. M. (2024). Enhancing postgraduate students' learning outcomes through Flipped Mobile-Based Microlearning. *Research in Learning Technology*, *32*. https://doi.org/10.25304/rlt.v32.3110.

Allela, M. A., Ogange, B. O., Junaid, M. I., & Charles, P. B. (2020). Effectiveness of Multimodal Microlearning for In-service Teacher Training. *Journal of Learning for Development*, *7*(3), 384–398. https://doi.org/10.56059/jl4d.v7i3.387.

Arsyad, S., & Zainil, Y. (2023). Research gap strategies in article introductions of different rank applied linguistics journals. *Studies in English Language and Education*, *10*(1), 216–234. https://doi.org/10.24815/siele.v10i1.25302.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *Early Childhood Development and Learning: New Knowledge for Policy*. National Academies Press. https://doi.org/10.17226/10067.

Carter, J. W., & Youssef-Morgan, C. (2022). Psychological capital development effectiveness of face-to-face, online, and Micro-learning interventions. *Education and Information Technologies*, *27*(5), 6553–6575. https://doi.org/10.1007/s10639-021-10824-5.

Conde-Caballero, D., Castillo-Sarmiento, C. A., Ballesteros-Yánez, I., Rivero-Jiménez, B., & Mariano-Juárez, L.

(2024). Microlearning through TikTok in Higher Education. An evaluation of uses and potentials. *Education and Information Technologies*, *29*(2), 2365–2385. https://doi.org/10.1007/s10639-023-11904-4.

Dolasinski, M. J., & Reynolds, J. (2023). Microlearning in the Higher Education Hospitality Classroom. *Journal of Hospitality & Tourism Education*, *35*(2), 133–142. https://doi.org/10.1080/10963758.2021.1963748.

Furo, P. T., & Abbey, J. R. (2020). Opportunity To Learn And Student Academic Engagement As Correlates Of Students' Achievement In Chemistry In Rivers State. *International Journal of Education and Social Science Research*, *03*(03), 89–100. https://doi.org/10.37500/IJESSR.2020.3038.

Gagne, J. C., Park, H. K., Hall, K., Woodward, A., Yamane, S., & Kim, S. S. (2019). Microlearning in Health Professions Education: Scoping Review. *JMIR Medical Education*, *5*(2), 13997. https://doi.org/10.2196/13997.

Garshasbi, S., Yecies, B., & Shen, J. (2021). Microlearning and computer-supported collaborative learning: An agenda towards a comprehensive online learning system. *STEM Education*, *1*(4), 225. https://doi.org/10.3934/steme.2021016.

Gorham, T., Majumdar, R., & Ogata, H. (2023). Analyzing learner profiles in a microlearning app for training language learning peer feedback skills. *Journal of Computers in Education*, *10*(3), 549–574. https://doi.org/10.1007/s40692-023-00264-0.

Gross, B., Rusin, L., Kiesewetter, J., Zottmann, J. M., Fischer, M. R., Prückner, S., & Zech, A. (2019). Microlearning for patient safety: Crew resource management training in 15-minutes. *PLOS ONE*, *14*(3), 213178. https://doi.org/10.1371/journal.pone.0213178.

Hall, M., Ramsay, A., & Raven, J. (2004). Changing the learning environment to promote deep learning approaches in first-year accounting students. *Accounting Education*, *13*(4), 489–505. https://doi.org/10.1080/0963928042000306837.

Ichiuji, B. A., DeAngelis, E. J., Corpodean, F., Thompson, J., Arsenault, L., Amdur, R. L., Vaziri, K., Lee, J., & Jackson, H. T. (2022). The Effect of a Microlearning Module on Knowledge Acquisition in Surgery Clerkship Students. *Journal of Surgical Education*, *79*(2), 409–416. https://doi.org/10.1016/j.jsurg.2021.11.001.

Javorcik, T., Kostolanyova, K., & Havlaskova, T. (2023). Microlearning in the Education of Future Teachers: Monitoring and Evaluating Students' Activity in a Microlearning Course. *Electronic Journal of E-Learning*, *21*(1), 13–25. https://doi.org/10.34190/ejel.21.1.2623.

Karlsen, J. T., Balsvik, E., & Rønnevik, M. (2023). A study of employees' utilization of microlearning platforms in organizations. *The Learning Organization*, *30*(6), 760–776. https://doi.org/10.1108/TLO-07-2022-0080.

Lee, Y.-M., Jahnke, I., & Austin, L. (2021). Mobile microlearning design and effects on learning efficacy and learner experience. *Educational Technology Research and Development*, *69*(2), 885–915. https://doi.org/10.1007/s11423-020-09931-w.

Li, Q., Jiang, Q., Liang, J.-C., Pan, X., & Zhao, W. (2022). The influence of teaching motivations on student engagement in an online learning environment in China. *Australasian Journal of Educational Technology*, 1–20. https://doi.org/10.14742/ajet.7280.

Mahmud, M. H., Nayan, M. T. H., Ashir, D. M. N. A., & Kabir, M. A. (2022). Software Risk Prediction. *Systematic Literature Review on Machine Learning Techniques. Applied Sciences*, *12*(22), 11694. https://doi.org/10.3390/app122211694.

Membiela, P., Acosta, K., Yebra, M. A., & González, A. (2023). Motivation to learn science, emotions in science classes, and engagement towards science studies in Chilean and Spanish compulsory secondary education students. *Science Education*, *107*(4), 939–963. https://doi.org/10.1002/sce.21793.

Mohamed Shaffril, H. A., Samsuddin, S. F., & Abu Samah, A. (2021). The ABC of systematic literature review: the basic methodological guidance for beginners. *Quality & Quantity*, *55*(4), 1319–1346. https://doi.org/10.1007/s11135-020-01059-6.

Pölzl-Stefanec, E., & Geißler, C. (2022). Micro-steps" on the route to successful online professional development for Austrian Early Childhood Educators. *International Journal of Educational Research*, *115*, 102042. https://doi.org/10.1016/j.ijer.2022.102042.

Puah, S., Bin Mohmad Khalid, M. I. S., Looi, C. K., & Khor, E. T. (2022). Investigating working adults' intentions to participate in microlearning using the decomposed theory of planned behaviour. *British Journal of Educational Technology*, *53*(2), 367–390. https://doi.org/10.1111/bjet.13170.

Rejemiati, R., Nawir, M., & Basri, B. (2022). Model Pembelajaran Berbasis Masalah (PBM) Terhadap Penguasaan Konsep IPS dan Kemampuan Memecahkan Masalah. *Briliant: Jurnal Riset Dan Konseptual*, *7*(4), 946. https://doi.org/10.28926/briliant.v7i4.1044.

Richardson, M. X., Aytar, O., Hess-Wiktor, K., & Wamala-Andersson, S. (2023). Digital Microlearning for

Training and Competency Development of Older Adult Care Personnel: Mixed Methods Intervention Study to Assess Needs, Effectiveness, and Areas of Application. *JMIR Medical Education*, *9*, 45177. https://doi.org/10.2196/45177.

Roberson, Q. M., Moore, O. A., & Bell, B. S. (2024). An Active Learning Approach to Diversity Training. *Academy of Management Review*, *49*(2), 344–365. https://doi.org/10.5465/amr.2020.0231.

Rogerson, A. M., & Rossetto, L. C. (2018). Accommodating Student Diversity and Different Learning Backgrounds. *Journal of Intercultural Communication Research*, 1–10. https://doi.org/10.1080/17475759.2018.1475293.

Romanenko, Y. N., Solodovnikova, E., & Maksimenko, N. (2023). Microlearning as a new method of teaching soft skills to university students. *Frontiers in Education*, *8*, 1177516. https://doi.org/10.3389/feduc.2023.1177516.

Romero-Rodríguez, J.-M., Ramirez-Montoya, M. S., Glasserman-Morales, L. D., & Ramos Navas-Parejo, M. (2023). Collaborative online international learning between Spain and Mexico: A microlearning experience to enhance creativity in complexity. *Education + Training*, *65*(2), 340–354. https://doi.org/10.1108/ET-07-2022-0259.

Sankaranarayanan, R., Leung, J., Abramenka-Lachheb, V., Seo, G., & Lachheb, A. (2023). Microlearning in Diverse Contexts: A Bibliometric Analysis. *TechTrends*, *67*(2), 260–276. https://doi.org/10.1007/s11528-022-00794-x.

Sathiyaseelan, B., Mathew, J., & Nair, S. (2024). Microlearning and Learning Performance in Higher Education: A Post-Test Control Group Study. *Journal of Learning for Development*, *11*(1), 1–14. https://doi.org/10.56059/jl4d.v11i1.752.

Scarino, A. (2022). Language teacher education in diversity – a consideration of the mediating role of languages and cultures in student learning. *Language and Education*, *36*(2), 152–169. https://doi.org/10.1080/09500782.2021.1991370.

Skalka, J., Drlik, M., Benko, L., Kapusta, J., Rodríguez Del Pino, J. C., Smyrnova-Trybulska, E., Stolinska, A., Svec, P., & Turcinek, P. (2021). Conceptual Framework for Programming Skills Development Based on Microlearning and Automated Source Code Evaluation in Virtual Learning Environment. *Sustainability*, *13*(6), 3293. https://doi.org/10.3390/su13063293.

Sözmen, E. Y., Karaca, O., & Batı, A. H. (2023). The effectiveness of interactive training and microlearning approaches on motivation and independent learning of medical students during the COVID-19 pandemic. *Innovations in Education and Teaching International*, *60*(1), 70–79. https://doi.org/10.1080/14703297.2021.1966488.

Su, Q., Cheng, G., & Huang, J. (2023). A review of research on eligibility criteria for clinical trials. *Clinical and Experimental Medicine*, *23*(6), 1867–1879. https://doi.org/10.1007/s10238-022-00975-1.

Troussas, C., Chrysafiadi, K., & Virvou, M. (2021). Personalized tutoring through a stereotype student model incorporating a hybrid learning style instrument. *Education and Information Technologies*, *26*(2), 2295–2307. https://doi.org/10.1007/s10639-020-10366-2.

Wang, S., & Han, C. (2021). The Influence of Learning Styles on Perception and Preference of Learning Spaces in the University Campus. *Buildings*, *11*(12), 572. https://doi.org/10.3390/buildings11120572.

Wee, B., & Banister, D. (2023). Literature review papers: The search and selection process. *Journal of Decision Systems*, 1–7. https://doi.org/10.1080/12460125.2023.2197703.

Zarshenas, L., Mehrabi, M., Karamdar, L., Keshavarzi, M. H., & Keshtkaran, Z. (2022). The effect of micro-learning on learning and self-efficacy of nursing students: An interventional study. *BMC Medical Education*, *22*(1), 664. https://doi.org/10.1186/s12909-022-03726-8.

Zolfaghari, M., Shirzadi, S., & Motamed, M. (2023). Using a mobile application for psychiatry training in medical students: A quasi-experimental study. *Australasian Psychiatry*, *31*(3), 389–394. https://doi.org/10.1177/10398562231159509.