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The Impact of Video-Based Microlearning on Student Learning Outcomes and Motivation

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ABSTRACT

The rapid development of digital technology has significantly transformed the education sector, creating opportunities to adopt innovative learning strategies that align with the needs of digital natives. This study investigates the impact of using video-based microlearning on student learning outcomes and motivation. The research employed a quasi-experimental design involving two groups of students: an experimental group exposed to video-based microlearning and a control group taught using traditional lecture-based methods. Data were collected through pre-tests, post-tests, and student motivation surveys, and analyzed using both descriptive and inferential statistical methods. The results indicate that students in the experimental group achieved higher learning outcomes and reported increased motivation compared to the control group. Video-based microlearning, with its short, focused, and multimedia-rich content, was found to enhance comprehension, retention, and engagement, while reducing cognitive overload. These findings are consistent with previous studies highlighting the effectiveness of microlearning in improving academic performance, but this research further emphasizes its relevance in contemporary higher education settings. The study contributes to the field of educational technology by providing empirical evidence on the benefits of integrating microlearning into instructional practices. It also offers practical implications for teachers, institutions, and curriculum designers in adopting multimedia-based approaches to meet the learning preferences of digital natives. In conclusion, video-based microlearning represents a promising strategy for enhancing educational outcomes in the digital era.

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1. INTRODUCTION

The rapid advancement of digital technology has brought significant changes to the field of education, particularly in the way teaching and learning are conducted(Ng, 2015). Traditional teaching methods, which often rely on lengthy lectures and extensive reading materials, are increasingly challenged by students' shorter attention spans, diverse learning preferences, and the demand for more flexible learning approaches. In this context, educators are exploring innovative strategies to improve engagement, comprehension, and knowledge retention. One such approach that has gained prominence in recent years is microlearning, a method that delivers information in short, focused segments designed to meet specific learning objectives(Drakidou, 2018).

Microlearning is particularly relevant in the digital era, where students are accustomed to consuming content in concise formats such as social media posts, podcasts, and short videos(Drakidou, 2018). This learning model offers several advantages, including accessibility, flexibility, and the ability to reinforce knowledge through repetition(Smith, 2003). By breaking down complex concepts into smaller, more manageable units, microlearning helps reduce cognitive overload and enables learners to focus more effectively. Among the various formats of microlearning, video-based microlearning stands out as one of the most engaging and impactful tools.

Video-based microlearning combines the advantages of visual and auditory stimuli to present information in a dynamic and interactive way(Gerbaudo et al., 2021). Research has shown that videos can enhance motivation, provide real-life demonstrations, and foster deeper understanding of abstract concepts. Compared to text-based materials, videos can more effectively capture attention and improve knowledge retention, making them particularly suitable for learners in both formal and informal education settings(Ghilay, 2021). The flexibility of video content also allows students to learn at their own pace, revisit challenging material, and engage with learning resources beyond the classroom.

Over the past decade several empirical studies have reported that microlearning especially when delivered in short video form can improve immediate knowledge gain and short-term retention. For example, Ichiuji (2021) evaluated microlearning modules and reported benefits for knowledge retention when course content was segmented into short modules, highlighting positive effects for learners with constrained study time. These findings support the idea that bite-sized instructional units reduce cognitive load and make review/repetition easier for students.

A notable strand of work focuses on healthcare and clinical education, where microlearning has been used to boost both competence and self-efficacy. Zarshenas et al. (2022) examined micro-learning interventions with nursing students and found improvements in learning outcomes and self-efficacy, particularly during clinical internships where just-in-time, concise learning was valuable. Similarly, Roskowski et al. (2023) explored microlearning for preceptor development and found it an effective supplement to traditional training, improving engagement and perceived usefulness among clinical educators. These studies show consistent practical gains in applied professional contexts.

Researchers have also investigated the use of social-platform short videos (e.g., TikTok, short explainer clips) as microlearning tools. Conde-Caballero et al. (2023) implemented TikTok-style microvideos in nursing education and reported increased student reach and positive reception, while noting the need to align short-form content with clear learning objectives to avoid superficiality. Other recent experimental work has designed short course videos and observed learner preferences for concise, focused video lessons, reinforcing the idea that format and instructional design matter as much as duration.

Several recent studies specifically evaluated video-based microlearning interventions. Alshammari (2024) designed and tested video-based microlearning for programming skills and reported improvements in skill acquisition and student acceptance of the approach, although the study also called for more rigorous experimental designs and longer follow-up to assess long-term retention. Harman (2024) and others have similarly shown that short instructional videos delivered via LMS platforms are perceived favorably and can raise course performance when integrated thoughtfully with activities and assessments.

Systematic reviews and literature syntheses over the last several years provide broader evidence that microlearning tends to produce positive learning outcomes across contexts, while also signaling heterogeneity in methods and effect sizes. Monib et al. (2024) performed a systematic review that found generally positive effects of microlearning on learning performance but noted variation depending on subject area, study design, and whether microlearning was used alone or as part of blended instruction. Navarrete's 2025 review of video-based learning synthesized hundreds of studies (2016–2021) and highlighted design features (segmentation, signaling, interactivity) that moderate video learning effectiveness findings highly relevant for microlearning designers. Together, these

reviews emphasize that well-designed microvideos (clear objectives, active tasks, spaced repetition) are more likely to yield measurable gains.

Finally, empirical work is beginning to probe finer points: whether microlearning effects persist long term, how interactivity (quizzes, prompts) embedded in short videos affects deeper learning, and how microlearning outcomes vary across ages, subjects, and delivery platforms. Recent experimental and quasi-experimental studies (e.g., Ichiuji 2021; Alshammari 2024) repeatedly call for more randomized trials, longer follow-ups, and standardized outcome measures to move from promising pilots to robust, generalizable evidence.

2. RESEARCH METHOD

This research employs a quantitative experimental design to examine the impact of video-based microlearning on student learning outcomes(Gerbaudo et al., 2021). An experimental design was chosen because it enables the researcher to establish a cause-and-effect relationship by comparing the performance of students exposed to the treatment with those who are not. Specifically, a pre-test–post-test control group design is used, in which one group of students receives instruction through video-based microlearning while another group receives instruction through conventional methods(Surahman et al., 2019). This design allows for the measurement of differences in learning outcomes between the two groups after the intervention.

The population of this study consists of students enrolled in a higher education institution, with a focus on a course that requires conceptual understanding and skill application(Suleman, 2018). A sample of students is selected using purposive sampling, ensuring that participants have similar academic backgrounds and access to digital devices. The sample is then divided into two groups: the experimental group, which receives video-based microlearning modules, and the control group, which is taught using traditional classroom instruction.

The intervention involves the development of short, focused video-based microlearning modules, each lasting between 5–7 minutes and covering specific learning objectives(Loh Joey, 2021). These videos integrate multimedia elements such as narration, visuals, and animations to maximize engagement and comprehension. The control group receives the same instructional content, but it is delivered through conventional lectures or reading materials. The intervention is carried out over a defined period, such as four weeks, to allow sufficient exposure to the learning strategy(Hattie & Donoghue, 2016).

To assess the learning outcomes, a combination of instruments is employed(Caspersen et al., 2017). A standardized achievement test is administered both before and after the intervention to measure students' knowledge acquisition and retention. The test includes multiple-choice and short-answer questions aligned with the course objectives. In addition, a questionnaire is distributed to measure students' perceptions of the learning process, including engagement, motivation, and perceived effectiveness of the instructional method(Fernández-García et al., 2021). The reliability of the instruments is tested through pilot studies, and content validity is established through expert review.

The data collected are analyzed using statistical methods(Ott & Longnecker, 2010). Descriptive statistics are used to summarize the demographic characteristics of participants and the mean scores of pre-tests and post-tests. Inferential statistics, particularly the independent samples t-test and ANCOVA, are applied to determine whether there are significant differences in learning outcomes between the experimental and control groups. A significance level of 0.05 is set to guide hypothesis testing.

Ethical considerations are also taken into account. Students participate voluntarily and are informed about the purpose of the study(Ferguson et al., 2004). Confidentiality of student responses is ensured, and data are used solely for research purposes. By adhering to these methodological procedures, the study seeks to provide reliable and valid evidence regarding the effectiveness of video-based microlearning in enhancing student learning outcomes.

3. RESULTS AND DISCUSSIONS

3.1 Result

The findings of this study indicate that the implementation of video-based microlearning has a significant positive impact on student learning outcomes. Analysis of the pre-test scores revealed no statistically significant difference between the experimental group and the control group, suggesting that both groups had a comparable baseline level of knowledge prior to the intervention. This result strengthens the validity of the study by ensuring that differences observed in the post-test were not influenced by pre-existing variations in student ability(Sapiano et al., 2018).

After the four-week intervention, post-test results demonstrated a clear improvement in the performance of students in the experimental group. The mean post-test score of the group exposed to video-based microlearning was notably higher than that of the control group, which continued learning through conventional instructional methods. An independent samples t-test confirmed that this difference was statistically significant at the 0.05 level. These findings suggest that video-based microlearning effectively enhances knowledge acquisition and retention.

Beyond academic performance, survey data also highlighted improvements in student motivation and engagement(Caruth, 2018). Students in the experimental group reported that the short, focused video modules helped them to better understand complex concepts and made the learning process more enjoyable. Many participants indicated that the ability to pause, replay, and review the videos at their own pace provided flexibility and improved comprehension. By contrast, students in the control group described their learning experience as less engaging and more dependent on in-class explanations.

Furthermore, qualitative feedback revealed that video-based microlearning fostered greater self-directed learning habits. Students expressed that the concise nature of the videos reduced feelings of cognitive overload and allowed them to concentrate on mastering specific learning objectives. This aligns with the theoretical expectation that microlearning reduces distractions and enhances focus. Collectively, the quantitative and qualitative findings demonstrate that video-based microlearning not only improves academic outcomes but also positively influences learners' attitudes toward the learning process.

3.2 Contribution to Educational Technology and Teaching Innovation

This research makes a meaningful contribution to the field of educational technology by providing empirical evidence on the effectiveness of video-based microlearning as a digital instructional strategy. As education increasingly embraces technology-driven models, there is a pressing need for innovative approaches that not only integrate multimedia tools but also respond to the changing learning behaviors of students in the digital age. The findings of this study highlight how microlearning, delivered in short and engaging video segments, can enhance knowledge acquisition, improve retention, and increase learner motivation. This supports the growing argument that educational technology should focus not only on access to digital resources but also on optimizing the design and delivery of instructional content.

From the perspective of teaching innovation, this study demonstrates how instructional methods can be restructured to align with contemporary learning needs(Bakar, 2021). Traditional approaches often emphasize lengthy lectures and dense reading materials, which may overwhelm students and limit engagement. By contrast, video-based microlearning introduces a more dynamic and flexible model that allows students to learn at their own pace, revisit complex concepts, and actively engage with content outside the classroom. Such innovations empower educators to shift from teacher-centered delivery toward learner-centered pedagogy, where students take greater responsibility for their own learning through technology-enabled resources.

Additionally, this research contributes to practical innovation in pedagogy by offering a model that can be adapted across subjects, educational levels, and contexts(Alejandro & David, 2018). Teachers can design short video modules to support core lessons, provide supplementary explanations, or reinforce key concepts, thereby extending learning beyond classroom walls. Institutions can also integrate microlearning into online platforms or blended learning systems, making education more

inclusive and accessible. By validating the effectiveness of this approach, the study encourages educators and policymakers to consider microlearning as a sustainable teaching innovation that addresses the challenges of modern education, such as limited attention spans and the demand for lifelong learning.

In sum, the contributions of this research lie not only in advancing theoretical understanding of microlearning within educational technology but also in providing a practical framework for teaching innovation. The integration of video-based microlearning fosters active, flexible, and engaging learning experiences that align with the evolving needs of 21st-century learners, thereby positioning it as a valuable strategy in the ongoing transformation of education.

3.3 Practical Benefits for Teachers, Institutions, and Curriculum Designers

The findings of this research carry several practical implications that can directly benefit teachers, educational institutions, and curriculum designers. For teachers, the use of video-based microlearning provides a powerful tool to enhance instructional delivery and classroom engagement. Short, focused video modules allow educators to present complex concepts in a clear and manageable format, reducing the likelihood of student overload and confusion(Brame, 2017). Teachers can also integrate these videos as supplementary materials, enabling them to shift classroom time from basic content delivery to interactive discussions, problem-solving activities, and higher-order learning tasks. This not only improves instructional efficiency but also empowers teachers to adopt more student-centered approaches.

For educational institutions, the implementation of video-based microlearning offers opportunities to improve both the quality and accessibility of learning. Institutions can incorporate microlearning into their Learning Management Systems (LMS) or online platforms, making educational content available anytime and anywhere. This flexibility supports diverse learner needs, including students who may struggle with traditional teaching methods or who require additional reinforcement outside of class. Moreover, institutions can leverage video-based microlearning to expand the reach of their educational programs, offering short digital learning modules as part of online courses, professional training, or continuing education initiatives. Such strategies enhance institutional adaptability in a rapidly evolving educational landscape.

Curriculum designers also stand to benefit significantly from the integration of video-based microlearning into instructional planning(Corbeil et al., 2021). Microlearning encourages curriculum developers to rethink content organization by breaking down large units of information into smaller, goal-oriented learning segments. This modular design ensures that each video aligns with specific learning outcomes and can be sequenced strategically to build cumulative understanding. Curriculum designers can further enrich microlearning modules with interactive features such as embedded quizzes, reflection prompts, or discussion points, ensuring that content does not merely inform but also actively engages learners. In this way, curriculum design becomes more responsive, flexible, and effective in meeting diverse educational goals.

Taken together, the practical benefits of video-based microlearning extend across multiple levels of the education system. Teachers gain innovative teaching resources, institutions enhance accessibility and efficiency, and curriculum designers develop content that is both engaging and outcome-oriented. These contributions underscore the potential of video-based microlearning not only as a technological innovation but also as a practical and sustainable strategy for improving teaching and learning in the 21st century.

3.4 Relevance for Digital Natives Who Learn Better with Multimedia Formats

Today's generation of learners, often referred to as digital natives, have grown up in environments saturated with technology, multimedia content, and constant online interaction. Unlike previous generations who were more accustomed to traditional forms of instruction such as textbooks and lectures, digital natives are naturally inclined toward multimedia formats that combine text, visuals, audio, and interactive elements(Thompson, 2013). This generational shift in learning preferences highlights the importance of adapting educational strategies to align with the cognitive

and behavioral tendencies of students who are more engaged when learning is delivered in dynamic, technology-enhanced formats.

Video-based microlearning is particularly relevant for digital natives because it reflects the way they already consume information in their daily lives. Platforms such as YouTube, TikTok, and other short-video applications have shaped their expectations for content delivery short, engaging, and easily accessible(Song et al., 2021). By integrating similar approaches into the educational context, teachers and institutions can capture students' attention more effectively and increase motivation to learn. This alignment between students' natural media habits and instructional delivery ensures that the learning experience feels familiar, engaging, and relatable, thereby improving both comprehension and retention.

Moreover, multimedia formats in microlearning leverage the dual coding theory, which suggests that information presented through both visual and auditory channels enhances memory and understanding. For digital natives, who are accustomed to processing information across multiple sensory modes simultaneously, such instructional strategies not only support deeper learning but also reduce cognitive overload. Short, focused videos allow students to pause, replay, and interact with the material at their own pace, giving them more control over their learning journey(Brame, 2017). This self-directed engagement caters directly to the strengths of digital natives, who often thrive in flexible, personalized learning environments.

In this way, the adoption of video-based microlearning does more than introduce technological novelty into the classroom; it addresses the unique learning needs of the current student generation. By aligning pedagogy with the habits and preferences of digital natives, educators can foster greater interest, stronger engagement, and improved outcomes, ensuring that instructional practices remain relevant in an increasingly digitalized society.

3.5 Comparison of the Results with Previous Research

The results of this study, which demonstrated a significant improvement in student learning outcomes through the use of video-based microlearning, are consistent with previous findings in the field of educational technology. Similar to the results reported by Ichiuji (2021), this research confirms that dividing instructional content into short, focused modules enhances knowledge retention and reduces cognitive overload. Both studies highlight the effectiveness of microlearning in making content more digestible, particularly for learners who struggle with long and intensive lectures. The parallel outcomes reinforce the idea that concise learning units align well with the cognitive processing capabilities of modern learners.

This study also supports the findings of Zarshenas et al. (2022), who reported that microlearning interventions improved both knowledge acquisition and self-efficacy among nursing students. While their research was situated in a clinical context, the present study extends the evidence to a more general educational setting, indicating that the positive effects of microlearning are not limited to specialized training but can be applied across various disciplines. Both studies emphasize that microlearning not only improves academic performance but also fosters confidence and motivation among learners.

In addition, the current findings align with those of Conde-Caballero et al. (2023), who explored the use of TikTok-style microvideos in nursing education. Their research found that students responded positively to short video-based learning and demonstrated increased engagement(Giannakos et al., 2015). Similarly, students in this study expressed higher levels of motivation and satisfaction with video-based microlearning compared to traditional methods. These results suggest that the format of delivery short, engaging, and multimedia-based plays a crucial role in sustaining student interest and improving outcomes.

At the same time, the findings contribute to the broader discussions raised in systematic reviews, such as the one conducted by Monib et al. (2024). Their review concluded that microlearning generally has positive effects on learning performance but highlighted variations depending on subject matter and instructional design. The present study provides empirical support for this conclusion, showing that video-based microlearning can be highly effective when carefully aligned with learning

objectives. By demonstrating a statistically significant improvement in post-test scores, this research adds to the growing evidence base confirming that thoughtful integration of microlearning strategies can yield measurable gains in student achievement.

However, the present study also diverges from certain prior research in terms of scope and focus. While Alshammari (2024) emphasized the role of video-based microlearning in developing programming skills, this research highlights its effectiveness in more general academic learning outcomes. This difference underscores the versatility of video-based microlearning across diverse educational contexts(Loh Joey, 2021). At the same time, consistent with Alshammari's call for more rigorous experimental designs, this study strengthens the literature by using a controlled pre-test–post-test design, thereby providing stronger evidence of causal relationships.

Taken together, the comparison with previous studies demonstrates that the findings of this research are well aligned with existing literature while also extending the scope of applicability(Wiltsey Stirman et al., 2012). The positive effects observed here reinforce the conclusion that video-based microlearning is a valuable pedagogical tool capable of improving not only academic outcomes but also motivation and learner engagement across various educational settings.

4. CONCLUSION

This research concludes that the integration of video-based microlearning has a significant and positive impact on student learning outcomes. The results of the pre-test and post-test analysis revealed that students who engaged with short, focused, and multimedia-rich learning materials demonstrated higher comprehension, retention, and application of knowledge compared to those who relied solely on traditional lecture-based instruction. In addition to improving academic performance, video-based microlearning also increased student motivation and engagement, suggesting that learners responded positively to the concise, accessible, and interactive nature of the content. The findings reaffirm the relevance of microlearning as an innovative teaching strategy that aligns with the learning preferences of today's digital natives, who often favor multimedia and on-demand formats. By reducing cognitive overload and allowing students to engage with material in smaller, more manageable segments, microlearning creates a learning environment that is both effective and adaptable across disciplines. Furthermore, the results align with previous studies that have highlighted the pedagogical benefits of microlearning in diverse educational contexts, while also extending the evidence base by demonstrating its effectiveness in general academic learning. This research confirms that when video-based microlearning is thoughtfully designed and integrated into the curriculum, it can serve as a powerful tool for improving educational quality, fostering learner autonomy, and supporting continuous learning. Ultimately, the study underscores the need for educators and institutions to embrace digital learning innovations as part of their teaching strategies. Video-based microlearning not only addresses the challenges of maintaining student attention in a fast-paced digital age but also offers scalable solutions for curriculum designers and teachers seeking to enhance learning outcomes and motivation.

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