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EFFECTIVENESS OF MICRO-LEARNING APPROACHES IN SKILL ACQUISITION AND VOCATIONAL TRAINING AMONG BUSINESS EDUCATION UNDERGRADUATES IN NIGERIA

Salihu Habiba Department of Business Education, Faculty of Social Sciences and Vocational Education, Federal University of Education, Zaria, Nigeria

Hajara Baba Maiturare Department of Business Education, Faculty of Social Sciences and Vocational Education, Federal University of Education, Zaria, Nigeria

Fatima Ahmed Maude, PhD Department of Business Education, Faculty of Social Sciences and Vocational Education, Federal University of Education, Zaria, Nigeria

Abstract

The increasing need for employability skills among university graduates in Nigeria has placed renewed emphasis on practical and vocational education, particularly within business-related disciplines. However, traditional pedagogical approaches continue to dominate Nigerian tertiary institutions, often prioritizing theoretical instruction over practical engagement. This study investigates the effectiveness of micro-learning strategies in enhancing skill acquisition among undergraduate students of Business Education at the Federal University of Education, Zaria. Grounded in Cognitive Load Theory, the research adopts a quasi-experimental design involving 48 final-year students who were randomly assigned to control and experimental groups. A researcher-developed Skill Acquisition Test (SAT) was administered as both a pre-test and a post-test to measure students' vocational competencies in business communication and office management. The findings revealed no significant difference in the pre-test scores between the two groups, indicating comparable baseline competencies. However, the post-test analysis demonstrated a statistically significant improvement in the performance of students exposed to micro-learning, with a higher mean score and p-value less than 0.05. These results affirm the effectiveness of micro-learning in improving vocational skills acquisition, particularly in resource-constrained educational environments. The study concludes that micro-learning serves as a flexible, scalable, and learner-centred instructional approach that supports repeated practice, content accessibility, and self-paced learning. Based on these findings, it is recommended that Nigerian universities, particularly those offering Business Education, formally integrate micro-learning strategies into their curricula. In addition, investments in mobile-friendly learning management systems and capacity-building for educators on digital content creation are essential to maximise the potential of micro-learning in vocational education.

Keywords: Micro-learning, Skill Acquisition, Business Education, Vocational Training, Cognitive Load Theory

1. Introduction

In today's dynamic economic and labour landscape, the demand for graduates with practical, job-ready skills has become more urgent than ever. Countries like Nigeria, where youth unemployment continues to rise despite expanding higher education enrolment, face the critical challenge of aligning university curricula with market demands (Lawal, 2024; Musa & Tijani, 2022). The Nigerian labour market now places a premium on vocational competencies such as communication, entrepreneurship, office management, and digital proficiency skills that are central to Business Education programmes. However, there is growing concern that traditional methods of instruction within Nigerian tertiary institutions are ill-suited to producing graduates with these competencies (Agogo & Otor, 2022; Ogunniyi & Pella, 2022).

Business Education, as a discipline, is intended to provide students with both academic knowledge and practical skills relevant to the modern business environment. Unfortunately, the predominant instructional methods remain largely theoretical, featuring extended lecture sessions,

outdated textbooks, and minimal hands-on engagement (Okonkwo & Adebayo, 2023). This situation is compounded by structural challenges in Nigerian universities, such as large class sizes, limited digital infrastructure, inadequate access to laboratories or practical training tools, and time constraints. Consequently, many Businesses Education graduates struggle to meet the expectations of employers, contributing to the broader issue of graduate unemployability in the country (Adebayo & Okafor, 2022).

To address this pedagogical gap, educators and researchers have increasingly turned to educational technologies that support more flexible, engaging, and learner-centred instruction. One such innovation is micro-learning, a teaching approach that involves delivering instructional content in short, focused segments typically under ten minutes via platforms such as mobile apps, social media, and learning management systems (Rodriguez & Chen, 2024; Martinez & Thompson, 2023). The micro-learning model is rooted in Cognitive Load Theory (Sweller, 1988), which posits that learners can retain information more effectively when it is presented in manageable units, thereby reducing cognitive overload and enhancing processing and retention.

Empirical research from various contexts has shown that micro-learning can improve learning outcomes, engagement, and retention, especially when implemented through digital tools such as WhatsApp, YouTube, and TikTok (Patel & Kumar, 2024; Johnson & Martinez, 2023). For example, Okonkwo and Adebayo (2023) found that educational video content delivered through TikTok significantly improved conceptual understanding among science students. Similarly, Adebayo and Okafor (2022) observed that peer-supported micro-learning via Facebook academic groups enhanced learners' participation and content mastery. These studies suggest that micro-learning has the potential to transform instructional delivery in higher education, particularly in resource-constrained environments like Nigeria.

Despite the increasing global attention micro-learning has received, there is limited evidence on its use and effectiveness in Nigerian university settings especially within vocational disciplines such as Business Education. Most existing studies focus on general education or science subjects at secondary school levels, leaving a critical gap in understanding how micro-learning could be leveraged to enhance skill-based education in higher institutions (Ezeudu & Obi, 2023; Lawal, 2024). Moreover, no known studies have empirically examined how micro-learning affects the development of vocational competencies such as office management, digital correspondence, and business communication among undergraduates in Nigerian universities.

This study, therefore, addresses an important knowledge gap by investigating the impact of micro-learning strategies on vocational skill acquisition among Business Education undergraduate students at the Federal University of Education, Zaria. The study is timely and relevant, as it contributes to ongoing conversations around curriculum innovation, digital pedagogy, and educational equity in developing contexts. By examining the effectiveness of a micro-learning intervention in a real-world Nigerian university setting, the research provides practical insights for educators, policymakers, and curriculum developers seeking to improve vocational education outcomes.

The increasing demand for graduates with practical, employable skills has led to a renewed focus on the relevance of vocational education in Nigeria's higher education landscape. Within this context, Business Education is expected to serve as a critical platform for equipping students with competencies in entrepreneurship, business communication, office management, and digital technologies. However, the effectiveness of this mandate is increasingly being questioned due to the persistent reliance on traditional, teacher-centred instructional methods that often emphasise theoretical learning over practical application (Agogo & Otor, 2022; Ogunniyi & Pella, 2022).

In many Nigerian universities, especially public institutions, Business Education continues to be delivered through long, uninterrupted lectures, limited opportunities for hands-on practice, and outdated curricula that are not aligned with the rapidly evolving demands of the 21st-century workplace. Structural challenges such as overcrowded classrooms, a shortage of qualified instructors, minimal access to digital instructional tools, and limited investment in practical training facilities

further compound the problem (Okonkwo & Adebayo, 2023). As a result, students are often unable to translate theoretical concepts into actionable skills, which contributes significantly to the skills mismatch frequently observed between university graduates and employer expectations.

While the global education community has increasingly embraced micro-learning as a viable solution to improve learner engagement, content retention, and skill development, its application in the Nigerian tertiary education sector remains minimal and under-researched. Micro-learning offers an approach that aligns with the learning preferences of digital-native students and enables access to brief, targeted instructional content that can be repeatedly reviewed and immediately applied. It is particularly suitable for vocational training environments where skill acquisition is the primary goal. Studies in other contexts (e.g., Patel & Kumar, 2024; Rodriguez & Chen, 2024) have demonstrated that micro-learning enhances learners' autonomy, performance, and satisfaction, especially when delivered via mobile-accessible platforms.

However, in the Nigerian context, especially within Business Education programmes, empirical evidence on the effectiveness of micro-learning strategies remains scarce. Existing studies have largely focused on general education or science subjects at the secondary school level, with little attention paid to higher education or vocational disciplines. Consequently, policy makers, curriculum developers, and institutional administrators lack the empirical data needed to support the integration of micro-learning into formal academic curricula. This lack of evidence perpetuates the dominance of outdated teaching practices and hinders the evolution of more effective, learner-centred pedagogies in vocational education.

This study, therefore, seeks to address this critical gap in the literature by empirically evaluating the effectiveness of micro-learning strategies in enhancing skill acquisition among Business Education undergraduates at the Federal University of Education, Zaria. By comparing the learning outcomes of students exposed to micro-learning with those taught through conventional methods, the study aims to provide actionable insights that can inform teaching practices, curriculum innovation, and institutional investment in digital pedagogy.

The overarching aim of this study is to evaluate the effectiveness of micro-learning strategies in enhancing vocational skill acquisition among Business Education undergraduate students in a Nigerian university context. Specifically, the study is designed to:

i. Determine the impact of micro-learning strategies on students' acquisition of practical business skills

ii. Compare the academic performance of students exposed to micro-learning content with those taught using traditional, lecture-based methods

iii. Explore the pedagogical implications of adopting micro-learning in Business Education programmes

iv. Contribute to the empirical discourse on educational technology in vocational training

To guide the inquiry and achieve the stated objectives, the following research questions are formulated:

i. What is the effect of micro-learning strategies on the vocational skill acquisition of Business Education students at the Federal University of Education, Zaria?

ii. Is there a statistically significant difference in skill acquisition performance between students exposed to micro-learning and those taught using conventional teaching methods?

The following null and alternative hypotheses are formulated:

Null Hypothesis (H_0)

There is no statistically significant difference in the mean skill acquisition scores between Business Education students taught using micro-learning strategies and those taught using conventional, lecture-based instructional methods.

Alternative Hypothesis (H_1)

There is a statistically significant difference in the mean skill acquisition scores between Business Education students taught using micro-learning

strategies and those taught using conventional, lecture-based instructional methods.

2. Literature Review and Theoretical Framework

2.1 Conceptual Review

Conceptualising Micro-Learning in Vocational Education

Micro-learning is increasingly gaining prominence as a flexible, learner-centred instructional strategy that offers content in small, focused bursts designed for quick comprehension and application. Typically lasting between two and ten minutes, micro-learning segments are delivered via digital platforms such as mobile applications, websites, and social media channels (Rodriguez & Chen, 2024; Martinez & Thompson, 2023). Unlike traditional pedagogical formats, which often overwhelm learners with large blocks of information, micro-learning fosters retention by enabling students to engage with content incrementally and at their own pace.

In the context of vocational education, micro-learning is particularly beneficial as it emphasises the acquisition of practical, task-based skills. Business Education, for instance, involves competencies such as office administration, communication, and information management, which can be broken down into micro-tasks well suited for this model of instruction. Patel and Kumar (2023) assert that micro-learning is especially useful for skill acquisition because it promotes repetition, focused attention, and immediate application characteristics that are essential for vocational training.

Furthermore, micro-learning complements the habits of modern learners, especially digital natives, who often prefer content that is accessible, mobile-friendly, and visually engaging. In a study by Johnson and Lee (2023), students reported higher levels of satisfaction and academic performance when exposed to brief, multimedia-based lessons on mobile platforms compared to standard lectures. The brevity, clarity, and convenience of micro-learning content have made it a practical solution in both formal and informal educational contexts, particularly where infrastructure or time constraints exist.

2. 2 Empirical Review

The application of micro-learning in educational contexts has yielded promising outcomes in various countries. Adebayo and Okafor (2022), in a study involving Nigerian secondary school students, demonstrated that Facebook-based academic groups using micro-content improved learning outcomes in science education. Similarly, Okonkwo and Adebayo (2023) reported that educational videos delivered via TikTok enhanced comprehension and learner engagement in digital marketing courses among university students.

In South Asia, Patel and Kumar (2024) documented the success of YouTube-based tutorials in boosting science test scores among secondary school learners, citing benefits such as visual demonstration, accessibility, and repeated exposure. These findings reinforce the argument that micro-learning, when well designed and appropriately deployed, can significantly improve learning outcomes in skill-based subjects.

However, while these studies provide valuable insights, they are largely limited to science and general education subjects, with minimal focus on Business Education or vocational programmes. Moreover, few empirical studies have examined the effectiveness of micro-learning within Nigerian higher education institutions, thereby justifying the need for more context-specific research.

Relevance of Micro-Learning in Nigerian Higher Education

Many Nigerian universities and colleges, especially those in the public sector, face persistent challenges such as overcrowded lecture halls, insufficient infrastructure, and outdated teaching methodologies (Agogo & Otor, 2022). These limitations hinder the effective delivery of vocational content, thereby weakening the employability of graduates. Micro-learning provides a scalable, low-cost, and technology-friendly solution to some of these problems. Its use of mobile-friendly platforms such as WhatsApp and Google Drive ensures accessibility even in low-resource settings.

Additionally, micro-learning facilitates just-in-time learning, allowing students to access instructional content when they need it most, such as before assessments or practical exercises. In a study

conducted by Lawal (2024), junior secondary school students in North-West Nigeria reported that micro-learning modules accessed through mobile phones helped them stay focused, better understand entrepreneurial tasks, and manage distractions effectively. These results suggest that micro-learning has the potential to make vocational training more inclusive, practical, and engaging in the Nigerian context.

2.3 Theoretical Framework: Cognitive Load Theory

This study is underpinned by Cognitive Load Theory (CLT), developed by Sweller (1988), which posits that learning is more effective when instructional content is structured to minimise cognitive overload. CLT distinguishes between three types of cognitive load: intrinsic (related to task complexity), extraneous (related to the way information is presented), and germane (related to processing and schema construction). Effective instructional design seeks to reduce extraneous load and optimise germane load to facilitate deeper learning.

Micro-learning aligns closely with the principles of CLT by breaking down complex instructional content into smaller, manageable units, thereby reducing extraneous cognitive load. When learners are presented with concise, clearly focused materials especially in visual or interactive formats they are more likely to understand and retain the information being conveyed (Rodriguez & Chen, 2024).

In vocational contexts such as Business Education, where learners must acquire not only theoretical understanding but also practical competencies, reducing cognitive overload is crucial. Micro-learning allows learners to master discrete tasks (e.g., file handling, digital correspondence) before integrating them into broader professional routines. This stepwise learning process supports the development of durable, transferable skills and enhances learner autonomy an outcome that is central to vocational education objectives.

In sum, Cognitive Load Theory offers a robust explanatory lens for understanding why micro-learning may be particularly effective in enhancing skill acquisition in Business Education, especially within resource-constrained educational environments.

3. Methodology

3.1 Research Design

This study adopted a quasi-experimental research design, specifically a non-randomised pre-test/post-test control group model, to examine the effectiveness of micro-learning strategies in enhancing skill acquisition among undergraduate Business Education students. This design was chosen due to its suitability for educational settings where random assignment to experimental and control groups is not feasible due to administrative, ethical, or logistical constraints (Creswell, 2014). By employing both a pre-test and post-test, the design allows for an assessment of changes in skill acquisition attributable to the instructional intervention, while also accounting for baseline differences between the groups.

3.2 Population and Sample

The target population for this study comprised all final-year undergraduate students enrolled in the Business Education programme during the 2024/2025 academic session at the Federal University of Education, Zaria. The final-year cohort was selected because these students had already completed most of their theoretical coursework and were expected to demonstrate vocational competencies relevant to business and administrative practices.

Using a simple random sampling technique, a total of forty-eight (48) students were selected to participate in the study. The sample was further divided into two equal groups of twenty-four (24) students each: an experimental group, which received instruction through micro-learning modules, and a control group, which was taught using conventional lecture-based methods. Efforts were made to ensure demographic and academic equivalence between the two groups to minimise selection bias.

3.3 Instructional Intervention Procedure

The experimental group was exposed to a structured micro-learning intervention over a period of four weeks. Instructional content was delivered in the form of short, modular video clips and PDFs, each lasting seven minutes or less, focusing on key skill

areas within business communication and office management—such as digital correspondence, file handling, scheduling, and record keeping. The materials were shared through mobile-accessible platforms, primarily WhatsApp and Google Drive, to facilitate flexible and repeated access. Students were encouraged to review the content at their convenience and to apply the knowledge through structured practice exercises. The control group, by contrast, received the same content through traditional face-to-face lectures, held in a classroom setting. Each session lasted approximately one hour, and the instructor followed a standard lecture format, using whiteboards and printed handouts. Both groups were taught by the same instructor to maintain consistency in instructional delivery.

3.4 Instrument for Data Collection

Data were collected using a researcher-developed Skill Acquisition Test (SAT), which served as both the pre-test and post-test instrument. The SAT consisted of both theoretical and practical components, designed to assess students' knowledge and application of vocational skills in business communication and office procedures. Items included objective questions, task-based simulations, and scenario-based assessments.

3.5 Data Analysis Techniques

Data were analysed using both descriptive and inferential statistical methods. Descriptive statistics (mean, standard deviation) were used to summarise the pre-test and post-test scores within each group. To determine the effect of the micro-learning intervention, paired samples t-tests were used to compare pre-test and post-test scores within each group. Independent samples t-tests were conducted to compare post-test scores between the experimental and control groups. All tests were conducted at the 0.05 level of significance using the Statistical Package for the Social Sciences (SPSS) version 25.0. This analytic approach provided a robust basis for determining whether the observed differences in skill acquisition could be attributed to the instructional strategy employed.

7. Results and Discussion

This section presents the results of the statistical analyses conducted to determine the effect of micro-learning on vocational skill acquisition among Business Education undergraduates. The analysis was guided by the research questions and hypothesis stated earlier. Both descriptive and inferential statistics were used to compare the performance of the experimental and control groups at the pre-test and post-test stages.

4.1 Comparison of Pre-Test Scores of Experimental and Control Groups

Table 1 below shows the pre-test mean scores and standard deviations for both the experimental and control groups before the micro-learning intervention commenced.

Table 1: Pre-Test Scores of Experimental and Control Groups

Group	N	Mean	Standard Deviation (SD)	t-value	p-value	Decision
Experimental	24	53.2	7.84	0.27	0.789	Not Significant (NS)
Control	24	52.6	8.10			

Source: Field Survey, 2025

As shown in Table 1, the mean score of the experimental group prior to the intervention was 53.2 (SD = 7.84), while the control group had a mean score of 52.6 (SD = 8.10). The result of the independent samples t-test yielded a t-value of 0.27 with an associated p-value of 0.789.

Since the p-value is greater than the 0.05 level of significance, the null hypothesis for the pre-test stage is retained. This indicates that there was no statistically significant difference in the initial skill acquisition levels of both groups before the commencement of the instructional intervention. This finding confirms that the two groups were academically comparable at

baseline, which strengthens the internal validity of the study and ensures that any subsequent differences in post-test performance can be more confidently attributed to the instructional method employed.

Table 2 presents the post-test performance of the two groups after the experimental group had undergone the micro-learning intervention and the control group had received traditional lecture-based instruction.

4.2 Comparison of Post-Test Scores of Experimental and Control Groups

Table 2: Post-Test Scores of Experimental and Control Groups

Group	N	Mean	Standard Deviation (SD)	t-value	p-value	Decision
Experimental	24	82.3	6.70	5.34	0.000	Significant (p < .05)
Control	24	68.4	7.90			

Source: Field Survey, 2025

Following the intervention, the experimental group attained a mean post-test score of 82.3 (SD = 6.70), whereas the control group recorded a lower mean of 68.4 (SD = 7.90). The independent samples t-test yielded a t-value of 5.34 and a p-value of 0.000, which is less than the 0.05 threshold for statistical significance.

This result indicates a statistically significant difference between the two groups' post-test scores, favouring the experimental group that received micro-learning instruction. The observed improvement provides strong evidence that the micro-learning strategy had a positive and measurable effect on students' skill acquisition in Business Education.

4. 3 Discussion of Major Findings

The findings of this study provide compelling evidence in support of micro-learning as an effective pedagogical approach for enhancing vocational skill acquisition among Business Education undergraduates in Nigerian higher education. The statistically significant improvement in the post-test performance of the experimental group, when compared to the control group, confirms that the use of micro-learning modules had a measurable and positive impact on students' understanding and application of vocational competencies.

This outcome is consistent with earlier research conducted by Rodriguez and Chen (2024), who reported that students exposed to structured, short-form learning content demonstrated better retention and application of knowledge than those taught using traditional lecture formats. In the present study, students who engaged with micro-learning content delivered via mobile-accessible platforms such as WhatsApp and Google Drive showed marked improvement in skill-based tasks, including digital correspondence, file management, and business communication. The findings suggest that micro-learning's brevity, focus, and ease of repetition provide an optimal cognitive structure for vocational learning, especially when aligned with Cognitive Load Theory (Sweller, 1988).

The findings also resonate with those of Adebayo and Okafor (2022), who found that digital micro-content supported by peer collaboration in Facebook academic groups significantly improved learners' motivation and performance. Similarly, Okonkwo and Adebayo (2023) demonstrated that students engaging with TikTok-based educational content developed higher interest and better conceptual understanding of course material. In this study, the flexibility and autonomy provided by micro-learning allowed students to engage with course content at their own pace, revisit difficult segments, and apply skills through formative practice all of which contributed to improved learning outcomes.

Importantly, the results highlight the potential of micro-learning to address pedagogical challenges prevalent in Nigerian public universities, such as overcrowded classrooms, time constraints, and limited access to practical training resources. By leveraging mobile technology which is already widely adopted among students educators can

circumvent infrastructural limitations and deliver instruction in more scalable and engaging ways. This aligns with the findings of Lawal (2024), who observed that micro-learning was particularly effective among secondary school learners in low-resource environments, improving their focus, retention, and engagement with entrepreneurial tasks.

In conclusion, the results of this study reaffirm micro-learning's potential as a transformative pedagogical approach for vocational training in Business Education. The strategy supports both theoretical grounding and practical application, making it a valuable addition to the instructional toolkit of educators aiming to bridge the skill gap in Nigerian tertiary education.

5. Conclusion and Recommendation

This study has investigated the effectiveness of micro-learning strategies in enhancing vocational skill acquisition among undergraduate students of Business Education at the Federal University of Education, Zaria. Drawing upon the principles of Cognitive Load Theory and utilising a quasi-experimental design, the research provides robust empirical evidence that micro-learning is a significantly more effective instructional approach than traditional lecture-based methods in promoting practical skills development.

The findings clearly demonstrate that students exposed to micro-learning modules outperformed their peers in the control group across key competencies such as digital correspondence, office communication, record-keeping, and task management. This improvement is not only statistically significant but also pedagogically meaningful, underscoring the instructional value of delivering content in short, focused, and accessible formats.

Importantly, this study contributes to the growing body of literature advocating for technology-enhanced, learner-centred pedagogies in vocational education. The results validate the claim that micro-learning is particularly well-suited for skill-based disciplines, as it accommodates individual learning preferences, enables flexible engagement with content, and encourages repeated exposure necessary for mastering procedural tasks.

In the Nigerian context—where infrastructural limitations, large class sizes, and outdated teaching methods pose significant challenges to effective instruction the adoption of micro-learning represents a promising alternative. It provides a scalable and cost-effective model that leverages existing mobile technology to deliver quality education, even in resource-constrained environments.

Moreover, the study fills an important gap in the literature by offering one of the few empirical examinations of micro-learning in Business Education at the tertiary level in Nigeria. The insights derived from this research have practical relevance for curriculum developers, educational administrators, and policymakers who seek to modernise pedagogical approaches and improve the employability of university graduates.

In light of the findings and conclusions of this study, the following recommendations are proposed to enhance the effectiveness of teaching and learning in Business Education, particularly with regard to skill acquisition through micro-learning strategies:

i. Curriculum Integration

Universities and other tertiary institutions offering Business Education programmes should formally incorporate micro-learning modules into their curricula. These modules should not replace traditional teaching methods but rather complement them by providing concise, skill-targeted instructional content that reinforces classroom learning and allows for self-paced review. This hybrid approach would improve both engagement and retention among students.

ii. Investment in Mobile-Friendly Learning Platforms

Given that many students already own smartphones and have basic digital literacy, institutions should prioritise the adoption and maintenance of mobile-friendly Learning Management Systems (LMS). Such platforms should be optimised for low-bandwidth environments and allow for easy sharing and retrieval of multimedia content. Free or low-cost open-source options such as Moodle Mobile or Google Classroom could serve as practical starting points for implementation.

iii. Capacity Building for Educators

Lecturers and instructional designers should be provided with ongoing professional development opportunities focused on digital pedagogy and micro-content creation. Training workshops should cover skills in designing, recording, and curating short instructional videos, interactive exercises, and assessment tools that align with learning outcomes in Business Education. Emphasis should be placed on culturally relevant and locally applicable content.

iv. Policy Support and Institutional Frameworks

At the policy level, university administrators and educational regulators such as the National Universities Commission (NUC) should develop guidelines that support the use of micro-learning within accredited vocational and business-related programmes. This includes allocating time within academic schedules for blended instruction and ensuring that digital teaching approaches are recognised in quality assurance reviews and programme accreditation.

vi. Further Research

Finally, it is recommended that future studies investigate the long-term effects of micro-learning on skill retention, employability, and academic progression. Comparative studies across disciplines and institutions would provide a broader understanding of the scalability and contextual adaptability of this instructional approach. Research should also explore the effectiveness of micro-learning when combined with other innovations such as gamification, peer assessment, or collaborative learning environments.

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