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Exploring Saudi University EFL Instructors' and Students' Perceptions of Microlearning, Nanolearning and Gamification for Student Engagement and Retention

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Abstract: The fast adoption of digital technologies in the education sector has altered the patterns of language learning, and specifically in the English as a foreign language (EFL) learning. The traditional approach to classroom-based learning cannot always ensure engagement and long-term knowledge retention, particularly in the case of the contemporary generations of students who are used to short and interactive technologies. Accordingly, such innovative approaches to learning as microlearning, nanolearning, and gamification have become solutions. This study examines how university students and instructors perceive the efficiency of these strategies in improving engagement, understanding, and retention in EFL learning settings. The methodology used to conduct the survey was quantitative in which 405 participants (312 students and 93 instructors) in universities in the Kingdom of Saudi Arabia were utilized. A structured questionnaire was employed as the data collection method based on a five-point Likert scale, which was analyzed based on the tool of descriptive statistics and chi-square test of goodness of fit. The results suggest that the perceptions of microlearning and nanolearning as the methods of simplifying the complex content of

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language and enhancing the retention of vocabulary and grammar are generally positive. The results also indicated that gamified strategies facilitate greater motivation among the students and make the process of learning a language more enjoyable. Students and instructors both admitted that these strategies do not displace traditional teaching, but may be used in conjunction with it. It suggests that microlearning modules, nanolearning units, and gamified activities should be incorporated in blended EFL teaching. Professional development of instructors is necessary to facilitate the implementation of this blended teaching. The findings add to existing research on digital pedagogy and provide practitioners with valuable information on how to enhance language teaching activities in higher education.

Keywords: Microlearning; nanolearning; gamification; EFL learning; student engagement; digital pedagogy; higher education.

1. Introduction

English is now the universal language of the academic world in terms of academic communication, professional growth, and work in the global environment. Therefore, most universities all over the world focus on building English language skills among students, especially in contexts in which English is taught as a foreign language (EFL). Although English language programs have been widely introduced in higher education, it is common to find that most students experience problems with keeping up with learning, mastering intricate linguistic construction, and retaining vocabulary and grammar over a period of time (Abdul Halim et al., 2024).

Conventional language teaching methods, usually based on lengthy lectures and instructor-centered teaching, may not be entirely relevant to the needs and learning styles of contemporary students (Vallorani et al., 2022). The present generation of students is highly affected by online digital technology and short-form media consumption. It is common to find students engaging with content using social media, mobile applications and online learning tools which provide information quickly and in an interactive manner (Ali & AbdAlgane, 2022; Al Mahmud, 2022). Consequently, an extended classroom time and a copious instructional material can result in lowered attention spans and loss of motivation.

Researchers in educational technology emphasize the need for progressive teaching methods that consider the cognitive practices and the digital demands of the modern learner (Alias & Razak, 2024a). A potential solution is microlearning, which entails the provision of educational materials in small and intensive 'bites' that usually take a few minutes to learn. Microlearning is meant to make complex issues easy to 'digest' by dividing them into smaller parts that can be easily recalled by the learner. This technique decreases cognitive load and enables students to focus on one concept at a time. Microlearning can be used in language learning scenarios as a short grammar tutorial, a vocabulary video, interactive quiz, or a short reading (Asih & Halisiana, 2022).

Another emerging strategy is nanolearning, an even more concise form of learning that delivers exceptionally small units of information that can be understood within a few seconds or minutes. Nanolearning is especially useful when certain knowledge points, such as vocabulary definitions, pronunciation tips, or brief grammar clarifications need to be reinforced (Astiwardhani & Sobandi, 2024). Nanolearning is particularly well suited to mobile learning contexts because students can engage in learning in minimal, convenient times, such as when they brief breaks or when commuting (Chamorro-Atalaya et al., 2024).

Along with such short-form learning methods, gamification has gained popularity in education. Gamification is the process of incorporating game features (such as points, badges, leaderboards, and challenges) into learning. These factors arouse motivation by developing an element of competition, advancement, and reward. Gamification has been found to be more participatory than traditional learning and motivate students to practice more in language learning (Chen, 2023; Sahari & Al Mahmud, 2024).

The combination of microlearning, nanolearning, and gamification is a change toward learner-centered digital pedagogy, in which the instruction process is shaped around cognitive patterns and technological behaviors of students. Nevertheless, even with the increase in the popularity of such approaches, questions still arise about their efficacy in practice in the educational setting. Available research is mostly centered on student outcomes, such as acquired vocabulary or test scores, while fewer studies focus on the perceptions of students and instructors regarding these methods (Cronin & Durham, 2024). Understanding instructors' perspectives is especially significant as they play a central role in instructional strategy design and implementation. Although innovative approaches may be effective in theory, they are unlikely to be implemented unless viewed by the instructors as practical and beneficial. In a similar manner, the perceptions of the students affect their readiness to use new learning approaches (De Gagne et al., 2019).

The current study is the part of the emerging research on digital pedagogy in EFL education. It presents comprehensive empirical evidence on the potential of synchronous integration of microlearning, nanolearning, and gamified instructions in higher education. In clear contrast with the numerous research works in the past which consider these strategies separately or attach more importance to learning outcomes, the current study is the first to combine all three strategies and compare their performance with the perceptions of students and instructors. The study provides new insights regarding engagement, motivation, and knowledge retention through data obtained from a substantial sample of university participants, demonstrating the practicality of combining short-form digital learning with traditional EFL classroom-based education.

The study aimed to investigate the perceptions of university students and instructors regarding the use of microlearning, nanolearning, and gamified strategies in EFL education. Through comparison of the two groups' points of

view, the study aimed at offering a clearer understanding of the methods that can be incorporated into conventional language learning practices.

Despite positive outcomes, ambiguities exist (Torres, 2024). The majority of studies focus on the results of the students, including the vocabulary that students have acquired, their understanding of learning grammar, and other related attitudes, rather than discussing the perspectives of those instructors who accept and use microlearning, nanolearning, and gamification (de Lima et al., 2023). Although microlearning, nanolearning, and gamification have been individually examined, little information is evident on their cumulative impact, particularly regarding how they can be integrated into conventional teaching methods. The application and development of tools and strategies are less evident in terms of their implementation and adoption (Zhang & Hasim, 2023). Thus, this research addresses those gaps by examining the perception of the instructors and students of microlearning, nanolearning, and gamified strategies, and how they can change engagement, retention, and the compatibility of such strategies with traditional EFL teaching.

The issue under consideration is that EFL students continue to face challenges with engagement, retention, and motivation. Class-based strategies are not always compatible with learner preferences for short interactive learning with elements of gaming. The suggested solutions are microlearning in small and focused courses and nanolearning with ultra-compact content, which can be delivered in a few seconds or a few minutes, and gamified strategies. No studies have been conducted to test the effects on student engagement, retention of knowledge and motivation in the context of EFL adequately, and little research has assessed the attitudes of instructors towards the use of such methods.

Therefore, this study's objective was to examine the views of EFL instructors regarding microlearning, nanolearning, and gamified methods of engaging and retaining students. Additionally, the study explored the views of EFL students on the use of microlearning, nanolearning, and gamification on enhancing their learning experiences in the English language. The study also ascertained the degree to which microlearning and nanolearning leads to vocabulary and grammatical retention in EFL education. Lastly, whether microlearning, nanolearning and gamified approaches are superior to traditional EFL teaching formats is investigated.

1.1 Research Questions

Q1: How do EFL instructors and students rate the effectiveness of microlearning and nanolearning in enhancing student engagement, understanding, and retention of English learning materials?

Q2: To what extent are microlearning, nanolearning, and gamified instruction methods appropriate to be integrated with conventional EFL classroom instruction?

2. Literature Review

2.1 Language Education Microlearning and Nanolearning

Microlearning can be defined as the provision of instructional material in small and concentrated units that target a particular learning goal. Microlearning modules are typically short in duration, ranging from a few minutes to approximately 15 minutes, in contrast to traditional instructional sessions that are considerably longer. Recent studies have reported that microlearning improves levels of engagement in students by minimizing overload of information and enabling students to understand knowledge in units (Lopez 2024; Zhu et al., 2024). Microlearning is usually implemented using digital tools, namely short instructional videos, quizzes, and interactive exercises. Microlearning modules in language education can be based on grammar rules, practicing pronunciation or learning vocabulary (Deterding et al., 2011).

Another benefit of microlearning is that it is flexible. Due to the concise nature of the learning units, students can complete them anywhere and anytime using mobile devices or online platforms. This flexibility facilitates self-directed learning and promotes repetition of content by students which enhances retention. However, some studies suggest that microlearning may oversimplify complex topics unless it is integrated into broader instructional approaches (El Tantawi et al., 2018). Prior research indicates that while microlearning is effective for introducing vocabulary and grammar concepts, deeper linguistic analysis often requires extended instructional time within traditional classroom settings. Accordingly, microlearning is widely characterized in the literature as a supplementary approach, rather than a replacement for conventional teaching methods.

Microlearning and nanolearning have been identified in recent literature as emerging instructional approaches that are increasingly adopted in digital learning environments. These approaches deliver content in concise units designed to enhance comprehension and learner engagement. The biggest distinction concerns the scale of content units that are offered: microlearning suggests slightly bigger units (lasting a few to 15 minutes of material); nanolearning implies very small and concise learning units, lasting seconds to a few minutes (Guerschberg & Gutierrez, 2024). Studies suggest that both approaches may support retention through flexible delivery, although concerns have been raised regarding limited depth of comprehension. These approaches have been discussed in the literature as contributing to flexible learning experiences that can address diverse learner needs in digital environments.

Research in educational contexts has reported several benefits associated with microlearning (Shail, 2023; Zhu et al., 2024). Microlearning divides complex issues into small units and enables learning to be understood at significantly better levels, minimizing cognitive overload and facilitating various learning speeds of learners. This, in its turn, offers flexible and accessible learning because computer technologies can be used on-demand through mobile applications and online learning resources, allowing students to engage with learning materials anytime and anywhere (Huotari & Hamari, 2012). An example of this is multimedia and

gamified quizzes, which serve as means of greater engagement and motivation of the students, making learning fun and effective. The advantages position microlearning within a broad spectrum of practice, ranging from higher education and corporate professional development to flipped classrooms and targeted skill acquisition.

In contrast, negative aspects of microlearning include a narrow focus and inaccessibility of digital tools. Microlearning is most effective in delivering concise knowledge but the content may lack depth, making it insufficient for mastering complex topics, unless integrated into broader macrolearning systems, such as classrooms or extended courses. The availability of necessary technology may pose a significant barrier to learning in instances. This raises concerns about educational equality and whether all learners will benefit from digital learning methods (Kapp, 2012). Pedagogically, microlearning as a teaching method cannot be assessed as effective since its outcomes are context-specific. In particular, situations that require immediate recall may show that higher engagement does not necessarily mean long-term knowledge retention or practical application.

The primary advantage of nanolearning is the possibility of rapid learning because it provides precise and concise information that can be used to update skills or reskill for roles in dynamic fields where knowledge is highly valued. The content is delivered in units that learners can retain and engage with, while managing professional, personal, and educational responsibilities, thereby supporting motivation and effective knowledge acquisition (Yousef et al., 2023).

Nanolearning utilizes various types of delivery, such as video, podcasts and mobile applications, which makes the material widely accessible to many individuals at anytime and anywhere. However, significant disadvantages accompany nanolearning's benefits. As a product of contemporary teaching methodologies, nanolearning remains at a relatively minor conceptual stage, with limited adoption and fewer studies conducted on it compared to microlearning. (De La Cruz et al., 2023). Content validation, review of bias, and learner feedback are important components that ought to be incorporated to ensure the quality and effectiveness of nanolearning materials. While videos, podcasts, or even mobile applications present students with easy-to-consume content that they willingly use during traveling, exercise or short breaks, the limitations of nanolearning lie in the narrow scope of these concise units; more complex topics require additional time and depth to be fully addressed.

2.1.1 Rapid knowledge acquisition and nanolearning

Nanolearning is an even more succinct instructional approach than microlearning. It conveys very short learning experiences and sometimes it takes only a few seconds or minutes. These very short learning units are narrowed to one piece of information which can be a vocabulary word, grammar rule, or guidance on pronunciation. Primarily, the greatest benefit of nanolearning is that it can offer instant knowledge reinforcement (Lee & Hammer, 2011). Due to the high level of concentration of the content, students are able to gain and retain information quickly. This makes nanolearning particularly effective in mobile

learning, where users favors brief interactions with educational materials (Thuy & Hung, 2021).

Research findings from cognitive psychology and digital learning studies indicate that short, repeated learning segments enhance knowledge retention through spaced repetition, a mechanism known to support long-term memory consolidation (Carpenter et al., 2022; Kang, 2016; Zhu et al., 2024). The short format also promotes spaced repetition, which is a learning process that is known to enhance long-term memory (Thompson & Hughes, 2023; Trumble et al., 2024). Nanolearning has limitations even though it has potential benefits. The short format can limit the level of elaboration that can be given. Consequently, nanolearning should be employed as an addition to learning and not a learning approach on its own (Astaño, 2025; Monib et al., 2025).

2.2 Student Involvement and Cognitive Retention

The involvement of students is a very important aspect that affects academic achievement in language learning. When students feel engaged, they tend to be more actively involved into classroom activities, they can learn language skills more frequently, and they are capable of enduring difficult learning exercises. Microlearning and nanolearning help increase engagement, because it is interactive and easy to study and consume, which observes the digital lifestyle of contemporary students (Marcelle & Brahim, 2023).

Recent research has shown that brief learning sessions can be more effective than extended lectures in maintaining learner attention and focus (Giurgiu, 2017; Zhu et al., 2024). Engagement is also enhanced by the interactive nature of quizzes, videos, and feedback systems (Giurgiu, 2017). Moreover, digital learning platforms offer flexibility that allows learners to study at their own pace, which has been associated with increased motivation and confidence (Shail, 2019; Zhu et al., 2024).

Learning is better maintained when learning content is given out in small units. Cognitive psychology research indicates that memory formation is strengthened when learning is distributed over time through repeated review, a process known as spaced learning (Burel et al., 2025; Martinengo et al., 2024). Microlearning and nanolearning facilitate this mechanism by allowing learners to revisit targeted content flexibly, thereby supporting retention and long-term memory consolidation.

2.3 Gamification in Language Learning

The use of gamification in language learning is defined as the use of game-like aspects to enhance motivation and interest in a non-game setting (Marczewski, 2013). Gamification in education is usually designed in the form of points, levels, badges, leaderboards and rewards. These factors develop competitiveness and attainment feeling that motivates students to engage in learning.

Gamification in language learning settings has been demonstrated to enhance vocabulary learning, fluency in speaking, and general motivation. Gamified systems are commonly used in digital platforms to monitor the progress of

students and also reward regular practice (as is often seen in language learning applications) (Mostrady et al., 2024). However, scholars warn that overdependence on competition can demoralize some students. As such, gamification must be a well-thought-out approach that balances competition and collaboration, leading to greater learning results.

3. Methodology

The research design that was used in this study was a quantitative survey in which the perception of different Saudi university students and instructors on microlearning, nanolearning and gamified strategies in EFL learning were considered. The quantitative strategy was chosen due to its ability to enable the researchers to accumulate standardized information about a significant number of participants and examine the patterns with the help of the statistical analysis.

3.1 Research Design

A questionnaire was designed to assess the perceptions of participants regarding the three major instructional strategies of microlearning, nanolearning, and gamification. The survey questionnaire was composed of seven statements involving engagement, understanding, motivation, and incorporation of these strategies in traditional classroom instruction. The participants responded using a five-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'.

3.2 Participants

The research comprised 405 people: 312 university students and 93 EFL instructors at Saudi universities. The students and instructors represented various academic disciplines and degrees of English proficiency. The teaching experience of instructors of EFL programs was not equal.

3.3 Data Collection

An online questionnaire was used to collect data in electronic form. The consent of the participants was obtained by assuring them that their responses would be kept confidential. The purpose of the study was clearly communicated. Participation was voluntary and the participants were at liberty to leave the study at any time. The questionnaire consisted of demographic questions and perception-based statements. The instruments were intended to assess the perceptions of the participants on the effectiveness of microlearning, nanolearning, and gamification in enhancing engagement, comprehension, and retention during EFL learning.

3.4 Data Analysis

Descriptive statistics and chi-square test of goodness of fit were used to analyze the data collected. Mean scores, and standard deviations of every questionnaire item were used as descriptive statistics. These indicators gave insights into the general degree of the consensus of the participants. A chi-square test of goodness of fit was used to establish whether a significant difference in distribution of responses between the five Likert scale and a distribution of equal response was evident. In this analysis, the probability of each category was 20, which was expected, and the degrees of freedom were four. Statistical significance was determined using a level of $p = 0.001$. The findings showed that the response was

not spread randomly and that the participants had definite preferences in relation to the three studied instructional methods.

4. Results

The results are displayed in two tables: Table 1 presents the responses of the students, and Table 2 presents the responses of the instructors.

Table 1: Students' perceptions

No.	Item	M	SD	Chi-square	P-value
1	Microlearning (brief, concentrated lessons) helps me remain interested in English language learning.	3.87	1.63	365.94	<0.001
2	Microlearning helps me comprehend and retain English vocabulary and grammar.	3.51	1.32	54.15	<0.001
3	Nanolearning (extremely brief information supplied in seconds or minutes) makes studying English simpler and more comfortable.	3.67	1.49	142.36	<0.001
4	Nanolearning allows me to recall English language topics better than standard classes.	3.74	1.34	121.37	<0.001
5	Gamified aspects (such as points, badges, or leaderboards) make studying English more pleasant and motivating.	3.588	1.44	80.82	<0.001
6	Combining microlearning, nanolearning, and gamification makes English learning more successful for me.	3.67	1.47	117.74	<0.001
7	I prefer learning English through short, interactive, and game-like activities rather than traditional long lessons	3.85	1.39	158.77	<0.001
	Overall score	**3.67**	**1.29**		

The first statement investigated the usefulness of microlearning in keeping the students interested in learning English. The average mean was 3.87 which showed considerable agreement. This is an indication that brief and intensive lessons can also keep students attentive.

The second statement examined whether microlearning enhances vocabulary and grammar understanding and retention. The average score was moderately agreeable at 3.51. Students tend to think that microlearning helps to retain a language.

The third statement was whether nanolearning simplifies the learning of the English language and makes it more comfortable. The average score was 3.67, which was positive with regard to this ultra-brief learning format.

The fourth item compared the ability of students using nanolearning to memorize English topics compared to traditional 'standard' classes. With the average of 3.74, students felt that nanolearning is an efficient tool.

The fifth statement concerned gamification aspects, such as points and badges. The average value of 3.58 shows that students find gamification encouraging and fun.

The sixth statement analyzed the integration of microlearning, nanolearning and gamification. The average result of 3.67 indicates that students think that incorporating such tactics facilitates learning.

The seventh statement evaluated the preference of short interactive learning activities over the traditionally long lessons among students. The average of 3.85 was indicative of a strong preference for interactive and brief learning.

In general, the mean score of the perception was 3.67, which shows that the attitude towards these innovative learning methods was positive in most cases.

A chi-square goodness-of-fit test was conducted for each item to determine whether the response was evenly distributed across the five Likert-scale response categories. The expected probability was 20% for each, and the degrees of freedom were 4. In all cases, the distributions were significantly different from an equal distribution ($p < .001$). Similarly, the test did not show the direction of the attitude held by the instructors. The interpretation of the findings drew on the descriptive statistics presented in Table 1 and Table 2. For stronger substantive inference (such as for determining if answers are statistically different from the neutral midpoint), future studies could further compare answers against the midpoint (such as using a one-sample Wilcoxon signed-rank test against 3).

Table 2: Instructors' perceptions

No.	Item	M	SD	Chi-Square	P-value
1	Microlearning, characterized by brief and concentrated sessions, effectively enhances student engagement in EFL programs.	3.69	1.36	25.66	<0.001
2	Microlearning improves pupils' retention of vocabulary and grammar.	3.60	1.25	18.56	<0.001
3	Nanolearning, characterized by ultra-brief content presented in seconds or minutes, is appropriate for EFL students.	3.60	1.43	22.86	<0.001
4	Nanolearning enhances the understanding and retention of English language material.	3.62	1.31	18.56	<0.001
5	Gamified tactics, such as points, badges, and leaderboards, enhance students' incentive to learn English.	3.67	1.22	21.14	<0.001
6	Microlearning, nanolearning, and gamification can be seamlessly incorporated into conventional classroom instruction.	3.52	1.44	20.07	<0.001
7	I am willing to adopt microlearning, nanolearning, and gamified strategies in my EFL teaching practices.	3.75	1.34	31.89	<0.001
	Overall score	**3.71**	**1.36**		

The first statement tested whether microlearning boosts student engagement. The average was 3.69, which means that instructors believe microlearning to be a good tool of engagement.

The second statement evaluated vocabulary and grammar retention as a measure of microlearning. The average score was 3.60, which indicates that instructors feel that microlearning facilitates the acquisition of language.

The third statement measured the appropriateness of nanolearning to EFL students. The average value of 3.60 shows that the instructors are aware of the compatibility of nanolearning with the current learning habits of modern students.

The fourth statement was to determine whether nanolearning facilitates comprehension and memory. The perception of this approach, as indicated by the mean score of 3.62, was positive.

The fifth statement considered gamified tactics. The average of 3.67 demonstrates that instructors think that gamification makes students more motivated.

The sixth item tested how microlearning, nanolearning, and gamification were integrated with conventional classroom learning. The average grade of 3.52 indicates that instructors tend to believe that these practices are compatible with existing teaching.

The seventh item evaluated the willingness of instructors to use these strategies. Most of the instructors indicated that they were ready to use them, with a mean score of 3.75. The total instructor perception score was 3.71, which depicts the existence of a highly positive orientation towards these approaches.

5. Discussion

The research results of this paper prove that students and instructors have positive perceptions of microlearning, nanolearning and gamification in EFL learning. These findings are in line with the findings of other studies which show that interactive and short learning experience can improve engagement and motivation among students (Mostrady et al., 2024). Among the most important findings is the overwhelming preference for short and interactive lessons by students. The large mean of the item that compares interactive learning to traditional long lessons indicates that contemporary students favor such dynamic and flexible forms of instruction (Yousef et al., 2023). This is an indication of wider trends in digital culture, in which people are now used to receiving information in small units (Pham et al., 2023).

Microlearning was found to be one of the most effective techniques of keeping students interested and aiding in the retention of vocabulary and grammar. The findings indicate that complex concepts of language can be broken into smaller units to enable students to process and memorize the information more easily (Qiao et al., 2022). This is in line with the cognitive load theory which focuses on the need to lessen information overload in the learning process. Both students and instructors also had positive perceptions about nanolearning. Nanolearning was found to be especially useful in the process of reinforcing certain points of knowledge because of its ultra-short format. As an illustration, students can be exposed to brief grammar explanations or vocabulary hints more than several times in a day (Sahari & Al Mahmud, 2024). Such repetition enhances the ability to remember and the encouragement of constant learning even beyond the classroom.

Motivation was another aspect that gamification helped to achieve. Students said that learning through the elements of a game (points, badges and leaderboards) allowed them to enjoy the process. Instructors also saw the motivational value of gamified strategies. However, it is indicated in literature that the implementation of gamification should proceed with restraint so that the learning goals are not dominated by the element of gamification (Samala et al., 2023). Another significant finding was the compatibility between innovative strategies and conventional instructional practices (Shortt et al., 2021). The two groups were in agreement that microlearning, nanolearning, and gamification ought to supplement, rather than replace, traditional classroom education. This suggests that blended learning models may provide the most effective framework for integrating digital pedagogical methods (Su et al., 2021).

6. Conclusion

This paper considered the views of college students and educators on the application of microlearning, nanolearning, and gamified approaches to EFL

learning. The findings indicate that both groups viewed these methods positively and believed they enhance engagement, motivation, and knowledge retention. Microlearning was appreciated as it helped to simplify complicated concepts of language. Nanolearning was considered efficient to reinforce particular knowledge points. Gamification helped in boosting motivation and involvement in language learning tasks. Notably, the participants noted that these strategies should not be used to substitute conventional classroom teaching. The results indicate that the combination of short digital learning modules and gamification can have a vast impact on ensuring that EFL programs become better experiences in terms of learning among Saudi university students.

6.1 Limitations

This study notes various limitations. First, the study was based on self-reported perceptions and not the actual measurement of learning outcomes. Second, Saudi university students and instructors were the only sample, and it can lead to doubts about the extrapolation of the findings to other educational settings. Third, the research adopted a cross-sectional survey research design, which does not allow for the assessment of long-term learning effectiveness. Future research should involve experimental designs to determine real changes in language proficiency and compare the various methods of instruction over a long duration.

6.2 Recommendations

Universities may think of introducing microlearning course units and game-based learning into the EFL curriculums to improve student experience. Professional development programs should be conducted in universities in which instructors are trained to design and execute microlearning and nanolearning material successfully. Moreover, online learning systems may be constructed to facilitate the possibilities of flexible and mobile learning. Instructors should ensure that such innovative strategies are accompanied with specific learning goals and are incorporated into larger instructional models. A combination of concise, digital learning units with traditional methods of teaching can provide an efficient and balanced language learning space.

6.3 Future Implications

The long-term implications of microlearning and nanolearning concerning language proficiency and academic performance should be examined in future research. It might be possible to compare traditional teaching strategies with experimental ones based on blended learning solutions that would use digital micro-modes and gamified assignments. Scholars can also examine how artificial intelligence and adaptive learning technologies can be used to personalize microlearning experiences. Furthermore, researchers may investigate the effect of cultural and institutional disparities on the adoption of these new teaching methods in the future. With the further development of digital technology, the inclusion of flexible and interactive learning approaches will gain more significance to enhance language learning all over the world.

Conflict of Interest
There is no conflict of interest.

7. Artificial intelligence Use Statement
The authors confirm that no artificial intelligence tools were used in the writing, analysis, or preparation of this manuscript.

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