

## **Integrating Word Cloud Technology with Active Learning Methods to Enhance Thai Undergraduate Students' English Grammar Competence**

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### **Abstract**

In the context of university-level education, the integration of active learning methodologies into grammar instruction has become increasingly indispensable for promoting learner engagement, autonomy, and higher-order thinking skills. In English as a Foreign Language (EFL) settings—particularly in Thailand—grammar remains a persistent pedagogical challenge. This quasi-experimental study investigated the effectiveness of incorporating word cloud technology within active learning frameworks to enhance grammatical competence among 38 second-year English major students at Bansomdejchaopraya Rajabhat University, selected through cluster random sampling.

Research instruments included pre- and post-achievement tests, student learning logs, and semi-structured interviews. Quantitative data were analyzed using descriptive and inferential statistics, including a paired-samples t-test and relative development scores. Results indicated a statistically significant improvement in students' grammatical competence ( $p < .05$ ), with a large effect size. Qualitative data from interviews and learning logs were thematically coded and content-analyzed, yielding three emerging themes: (1) Grammatical Competence, reflecting students' increased ability to understand parts of speech, sentence structures, subject-verb agreement, and vocabulary expansion through contextualized examples; (2) Learning and Teaching Activities, highlighting the motivational impact of group collaboration, Think-Pair-Share techniques, gamified exercises, and student-centered tasks; and (3) Technology in Enhancing English, emphasizing the role of word cloud tools in promoting engagement, independent learning, and instructional applicability, while also identifying challenges such as device limitations and unstable internet connectivity.

Findings from semi-structured interviews further corroborated the quantitative results, revealing that learners perceived the integration of word clouds and active learning as not only effective in reinforcing grammar skills, but also transformative in shaping their future

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pedagogical beliefs as pre-service teachers. Participants reported greater confidence, deeper vocabulary retention, improved reading comprehension, and increased enthusiasm for collaborative learning. Despite some technological constraints, students overwhelmingly endorsed the approach as a dynamic, visually engaging, and pedagogically sound enhancement to traditional grammar instruction in higher education contexts.

**Keywords:** Grammatical Competence, Thai EFL Learners, Word Cloud, Active Learning Method.

## **Introduction**

In the globalization era, English in Thailand has recognized as a foreign language for centuries. At present English is widely used both in academic and professional aspect. (Wongwattana & Watanapokakul, 2021). To acquire four language skills of English, competency of grammar is an essential factor. Grammar plays a crucial role in governing language use and structure, providing the framework necessary for constructing meaningful and coherent sentences (Khlood & Najwa, 2022; Phuwart & Boonchukusol, 2020). In both writing and reading, grammar is indispensable. Without it, effective communication, whether in written or spoken form, becomes challenging. A writer without grammar competence struggles to convey message clearly and risk miscommunication with the reader. Similarly, readers who fail to understand the grammatical structure of sentences may have to reread passages, leading to confusion or even frustration. Proper grammar is essential for producing clear, engaging sentences, preventing language from becoming incoherent, and illegible. It also facilitates clear exchanges, reducing ambiguity and preventing misunderstanding. In the absence of grammar, communication risks becoming unintelligible, leading to confusion or misinterpretation. Therefore, grammar is multifaceted and useful in acquiring the language including vital components in conveying meaning, ensuring clarity, and enabling efficient communication. (Frodesen, 2001).

At the university level, research on teaching writing skills, particularly in sentence construction or essay writing, indicates that problems in writing often stem from improper grammar, especially among learners who are studying English as a foreign or second language (EFL/ESL) at the common grammatical errors among learners include interference from their native language (first language interference errors), such as incorrect verb tense usage, word choice, sentence structure, article usage, prepositions, modal/auxiliary verbs, singular/plural forms, transitions, and subject-verb agreement (Watcharapunyawong, Somchai & Usaha, Siriluck, 2013; Latupeirissa, Wu, H. P., & Garza, E. V., Latupeirissa, D. S., & Sayd, A. I., 2019).

According to Khumphee, 2015, the most common types of grammar errors are verb-related errors including subject-verb agreement, verb tense, and handling of irregular verbs. Another study by Songboon et al. (2022) suggests that Thai students view grammar as a crucial element in the effective use of academic English. The participants in the study emphasized that proper grammar instruction should be given significant attention when defining course objectives in English

In foreign language instruction, the selection of teaching methods is also vital in the development of students' English language skills. Learning a second language involves various factors that may hinder the learning process, such as language barriers, fatigue from adapting to foreign language content in the classroom (limited language exposure), and a lack of motivation. (Akbari, 2015; Liton, 2016; Huwari, 2019; Aziz & Kashinathan, 2021). To address these challenges, the concept of active learning has been proposed as an effective approach for foreign language learners. Active Learning enables students to learn through interaction and engagement with a variety of learning activities, encouraging their participation in classroom activities to generate knowledge through speaking, writing, reading, reflection, or questioning. These learning activities can be conducted individually, in small groups, or in large groups, offering valuable and challenging opportunities that foster the development of higher-order thinking processes, such as problem-solving, analysis, and synthesis (Kayer, 2000; Gholami, Moghaddam, & Attaran, 2014; Yamauchi, 2020).

In the context of Bansomdejchoprayarajhabhat University, undergraduate students majoring in English, the Faculty of Education are required to concentrate on mastering various aspects of the English language, including the four core skills of listening, speaking, writing, and reading, as well as the fundamental concepts of teaching methodology for these skills. As a lecturer teaching the grammar course, it has been observed that students continue to struggle with understanding certain grammar topics. Based on a preliminary study and interviews with the instructor of the grammar course from the previous semester, it was found that the primary teaching methods employed were the direct method and grammar translation. Therefore, as the instructor of this semester's grammar course, it is crucial to explore a broader range of teaching methods to enhance students' grammar skills. In addition, to offer a more diverse teaching approach and improve students' knowledge of grammar structures which is the foundation of four English skills, the integration of word clouds was introduced in the classroom. A word cloud is a graphical representation of text, with visually appealing colors, where frequently used words or words with similar meanings are displayed larger than less frequent ones. This makes it easier to group words and enhances vocabulary retention. Moreover, some word cloud types can also

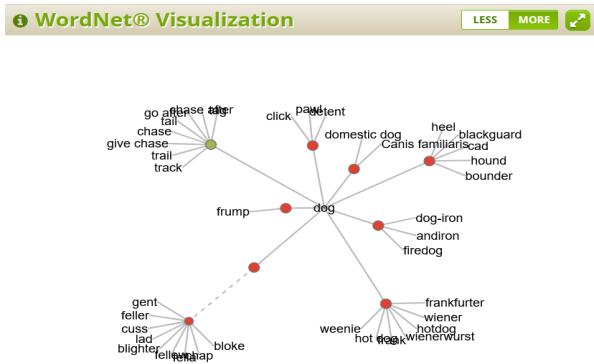
display example sentences, which can serve as model sentences for grammar and writing practice (Pradaphon & Rungruangthum, 2022). Thus, based on principles and rationale, the researcher recognizes the importance of conducting this study to explore the effects of integrating word clouds with active learning methods in enhancing grammar competences. This research aims to contribute to the development of English language instruction and improve the teaching and learning of English skills.

This study aims to investigate the effectiveness of implementing word cloud technology with active learning methods to enhance English grammar competence. The research questions were as follows:

1. In what way do the achievements of student's grammar competence after integrating word cloud and active learning methods?
2. What are the students' perceptions towards using word cloud with active learning in enhanced grammar competence?

### **Word Cloud Technology (Word Cloud)**

A word cloud, also known as a tag cloud, is a tool that captures phrases or words from content entered the word cloud system and organizes them by statistical frequency. These words are then displayed in a visually appealing graphic, with varying font sizes to indicate the relative importance of each word (tag). The larger the word, the more frequently it appears. Additionally, word clouds can present related vocabulary or expressions. Depending on the system used, word clouds can offer various features, such as extracting images from databases to illustrate the meaning of specific words or even presenting the information in sentence form (Huang, Wang & Ye, 2019). Table 1 provides a list of word cloud example which can apply in teaching reading and writing English skills. When learners use the word cloud and generate into the word cloud by using the word sift online program for example, the key word dog breed, this program will provide a connection word with part of speech, and example of sentence in various grammar context as follows.



#### "dog" in context (14 occurrences in 12 sentences)

- 1 What's a **dog** breed?
- 2 People have been breeding **dogs** since prehistoric times.
- 3 The earliest **dog** breeders used wolves to create domestic **dogs**.
- 4 From the beginning, humans purposefully bred **dogs** to perform various tasks.
- 5 For thousands of years, humans bred **dogs** toward the physical and mental traits best suited for the

Figure 1 A list of cloud word examples

#### Word cloud and English Language Teaching

With the advancement of technology, teachers can incorporate digital tools into the language classroom. Generally, online word cloud generators are used to teach the four skills of English. Jampakate & Rungruangthum (2020) focused on using word clouds in teaching reading comprehension and summarization. Furthermore, Rungruangthum & Pradaporn (2020) conducted a literature review of word cloud and English teaching research in the Google Scholar database from 2010 to 2022. They found that most studies emphasized designing classroom activities and teaching reading comprehension and vocabulary, with only 15% of the studies examining the use of word clouds in teaching writing. Additionally, Selvi (2021) noted that only a small number of studies have explored the use of word clouds in grammar production

## Active Learning

### The Concept of Active Learning

Active learning theory focuses on facilitating students' creation of knowledge independently. According to Bonwell & Eison (1991), this theory emphasizes teaching and learning activities that require students to engage in thinking and hands-on practice, which is believed to foster and stimulate their knowledge acquisition most effectively. The approach prioritizes active participation of the students and knowledge applying in real life. Furthermore, Meyers & Jones (1993) describe active learning as: 1) a natural human effort in the learning process, and 2) the recognition that everyone has a different approach to learning. Gholami, Moghaddam & Attaran (2014) assert that students actively engage through more than just listening; they must read, write, discuss, and, crucially, collaborate on problem-solving. This approach encourages critical thinking, analysis, synthesis, and evaluation. According to Felder & Brent (1996), the role of the learner shifts from being a passive receiver of knowledge to an active participant in the creation of knowledge (Co-Creator). Jones & Palmer (2017) further elaborate that active learning serves as a catalyst for learners to engage with knowledge. The methodologies employed in active learning offer more benefits than traditional direct learning, where the teacher primarily delivers content, and the students merely take notes. In contrast, active learning enables learners to generate new knowledge and engage in scientific processes.

## Grammatical Competence

Grammatical competence refers to the mastery of a language's structural components, encompassing knowledge of the lexicon, morphology, semantics, and phonology (Walt, 1993). According to Chomsky (1965), it involves both theoretical and practical knowledge of a limited set of grammatical rules that enable the generation of an unlimited number of correct sentences. In an operational sense, grammatical competence is defined as the ability to recognize and produce the distinct grammatical structures of a language, utilizing them effectively in communication. It is a key linguistic component, alongside other elements such as lexicon, syntax, and pronunciation, and is described as the capacity to understand and convey meaning through the production and recognition of well-formed phrases and sentences.

Kolln & Funk (2010) categorize grammatical competence into two types: structural grammar and transformational grammar. Structural grammar focuses on describing language by analyzing how words change in sound and spelling, as well as their usage within a sentence. It involves the study of parts of speech, clauses, and phrases to understand how spoken and written language

functions. On the other hand, transformational grammar seeks to transform basic sentences into various forms, addressing changes in phrase structures. This theory of grammar explains language constructions through linguistic transformations and phrase structures, often referred to as transformational generative grammar (T-G or TGG). The key distinction between the two lies in that structural grammar analyzes the functioning of language through parts of speech, clauses, and phrases, while transformational grammar extends this analysis to account for the variations in phrase structures.

### **Active Learning in Teaching Grammar**

Grammatical difficulty remains one of the persistent challenges faced by students in learning English as a foreign language (Al & Nagaratnam, 2011; Manda, 2023). To address this issue and promote more effective grammar acquisition, the implementation of active learning strategies has been recognized as a beneficial approach. According to Al, 2019 use active learning encourages the secondary student engagement in teaching grammatical concepts, it is found that active learning method has positively on learning grammar of the participants. At the tertiary level, especially undergraduate students, the research of Sante & Icigawa, 2023) highlighted in EFL grammar classroom, active learning encourage the students more pleasant in learning and help the to be active learners.

### **Research Methodology**

#### **Participants**

The population of the study was the population for this study consists of first-year students from sections D1 and D2, totaling 84 students who enrolled in grammar course in the second semester in academic year 2024. The researcher selected a sample using cluster sampling, where classrooms were used as the sampling unit. A method was employed randomly select the D 2 section, totaling 38 students ensuring that students with varying levels of ability—high, medium, and low—were included in the sample.

This study was conducted in strict adherence to ethical principles for research involving human participants. Participants were fully informed about the study's objectives, procedures, potential benefits, and any associated risks through a clear and comprehensive consent process. All participants voluntarily agreed to participate and provided written informed consent prior to their involvement in the research. To ensure privacy and confidentiality, participant data was

anonymized by assigning unique codes and securely storing all information to prevent unauthorized access. Participation was entirely voluntary, and participants retained the right to withdraw from the study at any time without any consequences.

### **Research Instrument**

To achieve the research objectives, three primary instruments were developed and implemented, as follows:

#### **1. Grammar Achievement Test (Pretest and Posttest)**

The grammar assessment was systematically constructed and divided into three distinct sections, comprising a total of 30 items. Part I (10 items) required students to identify the part of speech of given lexical items. Part II (10 items) assessed their ability to select appropriate verb forms within sentence structures based on contextual clues. Part III (10 items) focused on syntactic competence by asking students to rearrange jumbled words into grammatically correct sentences. The test underwent rigorous validation processes. The Item-Objective Congruence (IOC) values for all items exceeded 0.70, confirming content validity. Item difficulty analysis was also conducted to ensure a balanced range of item complexities. Furthermore, the internal consistency reliability, calculated using Kuder-Richardson Formula 20 (KR-20), yielded a coefficient of 0.85, indicating a high level of reliability.

#### **2. Learning Log**

At the end of each instructional session, participants were required to complete a structured learning log aimed at capturing reflective insights into their learning behaviors and experiences. The log entries focused on the integration of Word Cloud technology with active learning strategies in the development of English grammar skills. Specific prompts guided students to report on the usability and challenges of the learning innovation, the perceived roles of teachers and learners within an active learning environment, and any obstacles encountered when interacting with the digital tools. These reflective data served as a critical source for triangulating qualitative findings and identifying emerging patterns in learner autonomy and engagement.

#### **3. Semi-Structured Interview Protocol**

A semi-structured interview guide was developed to elicit in-depth qualitative data regarding students' perceptions and attitudes toward the instructional intervention. The questions were designed to explore both the perceived benefits and behavioral impacts of the Word Cloud-based grammar instruction, as well as the participants' intentions to incorporate similar technologies and methodologies into their own teaching practices as prospective educators.

Interviews were conducted with a purposive sample of participants and thematically analyzed to reveal recurring themes relevant to learner engagement, instructional adaptability, and future pedagogical integration.

### **Data Collection and Data Analysis**

Data were collected from 38 second-year students (D2 section) enrolled in the *Advanced Grammar for Teachers* course at Bansomdej Chaopraya Rajabhat University during the second semester of the 2024 academic year. Three research instruments were employed to obtain both quantitative and qualitative data. First, a grammar competence pretest and posttest, each consisting of 30 items across three sections—identifying parts of speech, selecting contextually appropriate verb forms, and rearranging scrambled words into grammatically correct sentences—were administered and analyzed using a paired-sample *t*-test. The Shapiro-Wilk test confirmed the normal distribution of scores, with *p*-values of .32 for the pretest and .09 for the posttest ( $p > .05$ ). Second, semi-structured interviews were conducted to explore participants' perceptions and experiences with the integration of word cloud technology into active learning strategies. The interview protocol comprised open-ended questions designed to elicit detailed insights while allowing for follow-up probing. Third, learning logs were employed as reflective tools for triangulation purposes, completed at the end of each class session to capture students' observations regarding the instructional process, the role of technology, perceived challenges, and the dynamics between teacher and learner. Qualitative data obtained from both the interviews and learning logs were analyzed using thematic coding procedures following Strauss and Corbin's (1990) methodology. All responses were initially recorded in Thai and subsequently translated into English for content analysis and interpretation.

### **Results**

#### **1. Research Question 1: In what way do the achievements of student's grammar competence after integrating word cloud and active learning methods?**

To answer this question, the achievement test (pretest and posttest) was used in week 1 and week 7 to compare the difference in the development of the students. The findings of the achievement test are presented in table 3 as follows.

**Table 1 Paired-Samples t-test of Grammatical Competence Before and After the Integrating word cloud technology with active learning methods**

Grammar Competence	$\bar{x}$	SD	$\bar{d}$	$SD\bar{d}$	t	Sig.	Cohen's d
Before learning	13.21	2.22		5.87	2.28	17.06	.00
After learning	19.08	2.07					2.58

\* $p < .05$

Table 1 presents the mean scores and standard deviations of students' grammar competence before and after the intervention. A paired samples *t*-test revealed a statistically significant difference ( $t = 17.06$ ,  $p < .001$ ), indicating a notable improvement in posttest scores. The effect size, measured by Cohen's *d* (2.58), reflects a very large effect, suggesting that the use of word cloud technology integrated with active learning had a strong and substantial impact on students' grammar competence.

**2.What are the students' perceptions towards training using word cloud with active learning in enhanced grammar competence?**

To answer this question, two research instruments were used to analyze the data, students learning log and interviews completed by the researcher. The learning log was given to students to record their reflections upon completing the eight-week study. The learning log included three questions: (1) their understanding of grammar, (2) the roles of students and teachers during the study, and (3) feedback on the use of the word cloud generator. The learning logs were transcribed and coded in table 2.

**Table 2. Emerging Theme and description generated from emerging themes of students learning log.**

Emerging themes	Description of the themes
1. Grammatical Competence	<ul style="list-style-type: none"> <li>- Learning about part of speech/new vocabulary and structure of the sentence.</li> <li>- Choosing various vocabulary words in writing and speaking.</li> <li>- Knowing how to talk about subject verb agreement in the sentence.</li> <li>- Learning unseen or new vocabulary</li> <li>- Using word cloud to learn more grammar on</li> </ul>

Emerging themes	Description of the themes
	<p>one own at home.</p> <ul style="list-style-type: none"><li>- Learning many grammars topic in the example sentence.</li><li>- Arranging sentences grammatically correctly.</li></ul>
2. Learning and Teaching Activities	<ul style="list-style-type: none"><li>- Helping my friends find answers and consult with them.</li><li>- Being motivated by active learning methods.</li><li>- Enjoying learning in groups.</li><li>- Co-working to solve problems when doing exercises.</li><li>- Less stressful because there is no grading to evaluate our performance – playing games is exciting.</li><li>- Enjoying the "Think-Pair-Share" activity while believing that active learning can be applied to teaching students as a preservice teacher</li><li>- Being provided with opportunities to ask and answer questions</li><li>- Using challenging questions and being provided with worksheets and guidance</li></ul>
3. Technology in enhancing English	<ul style="list-style-type: none"><li>- Identifying theme and concept of grammar from the example in word cloud</li><li>- Enjoying word sift for learning English.</li><li>- Designing with beautiful and colorful letter</li><li>- Appearing of many vocabularies and sentences</li><li>- Using it with their students in the future</li><li>- Hard to access sometimes if the Wi-Fi is not very good</li><li>- Needing a larger screen, like a laptop or iPad<ul style="list-style-type: none"><li>- if using a mobile phone, the screen size is too small, making it hard to see.</li></ul></li></ul>

### Finding from the interviews

Qualitative data obtained from semi-structured interviews with seven participants revealed students' perceptions regarding the integration of word cloud technology with active learning

strategies in enhancing grammatical competence. The interview responses were thematically analyzed and, where appropriate, transformed into quantifiable data to support triangulation of findings.

**Question 1: "How has learning through active learning combined with word clouds helped you learn grammar?"**

The majority of respondents reported that the integration of active learning techniques significantly enhanced their motivation to study English. Initially, several students expressed hesitation and shyness in using English communicatively, particularly in speaking and asking questions. However, when encouraged by the instructor to engage in collaborative group activities, their confidence gradually increased. Notably, three participants—who identified themselves as preservice teachers—indicated that they intended to incorporate similar active learning approaches in their future teaching practices, acknowledging the effectiveness of such methods in promoting student engagement and understanding.

**Question 2: "In your opinion, how can active learning combined with word clouds be applied to teaching and learning?"**

Participants expressed overwhelmingly positive attitudes toward the pedagogical application of word cloud technology. They emphasized the utility of word clouds in expanding vocabulary and linking key terms to related online resources, which in turn fostered autonomous learning beyond the classroom. Moreover, students reported that visualizing vocabulary through word clouds enhanced their retention, improved reading comprehension, and facilitated the development of coherent writing skills by allowing them to see language patterns and thematic clusters.

The integration of word clouds within active learning frameworks was widely recognized as a transformative pedagogical innovation. Students consistently remarked on the tool's effectiveness in promoting lexical acquisition and grammatical awareness. For instance, one participant stated, *"Word clouds made learning new words enjoyable. I could see different parts of speech for each word, which helped me understand sentence structure."* Another student reflected, *"I didn't know proper word order before, but group work and support from the teacher made me more confident after using these tools."* Similarly, another noted, *"I learned new vocabulary, and some words were linked to related terms. I could generate sentences from word clouds to support my grammar learning."* Furthermore, in term of autonomous learners one students reflected that *"I will use this program to improve grammar at my home."* Besides two of

students agreed that “ *I will use this program with my students teaching vocabularies when I go to school for internship course.* ”

Beyond linguistic development, the tools significantly enhanced classroom engagement. One student reported, “*The Think-Pair-Share technique made me feel more comfortable compared to speaking alone in front of the class.* ” Students also appreciated the collaborative dimension of the approach, particularly the real-time sharing of responses among peers. As one participant described, “*Working in groups and discussing others' answers helped me verify my understanding and provided new perspectives.* ” Additionally, students valued the immediacy and personalization of teacher feedback. One student noted, “*I appreciated that the teacher came to speak with our group and gave instant feedback on my responses—it motivated me to improve and understand more.* ”

Despite the numerous benefits, some challenges were identified. Technological limitations—particularly unstable internet connections—occasionally disrupted learning activities. One student expressed frustration, saying, “*When the internet was slow, I couldn't click on the words properly.* ” Furthermore, while the rapid generation of vocabulary was generally viewed as an advantage, some students reported cognitive overload. As one participant explained, “*I liked how fast it was, but sometimes there were too many words appearing on the screen, and it was overwhelming.* ”

### **Discussion and Implication**

The findings of this study underscore the pivotal role of grammatical competence in English language learning. Insights drawn from interviews and learning logs revealed that students perceived grammar as the foundational element supporting the development of all four core language skills—listening, speaking, reading, and writing. This aligns with the view of Phuwarat & Boonchukusol (2020), who emphasized that grammar instruction not only enhances learners' oral and reading abilities but, more importantly, contributes substantially to the improvement of writing proficiency. To support students in achieving their academic goals, it is essential to ensure that they comprehend not only the form and function of grammatical structures but also develop effective personal learning strategies. In particular, the significance of learners' individual learning styles becomes especially apparent in EFL contexts, where such preferences can greatly influence the pace and depth of language acquisition.

Active learning strategies have demonstrated considerable promise in this regard, as they foster a supportive and interactive learning environment. As highlighted by Shaaruddin and

Mohamad (2017) & Eison (2010), such strategies promote dynamic student-teacher engagement, cultivate open-mindedness, encourage respect for differing viewpoints, and enhance communication and collaboration among students. Learning logs further underscored the central role of the teacher in facilitating active learning. Rather than serving as a mere transmitter of knowledge, the teacher in an active learning setting acts as a facilitator who designs meaningful tasks that promote critical thinking, reflection, and cooperative learning. Techniques such as group discussions, peer teaching, and problem-based learning are instrumental in encouraging learners to actively construct knowledge. Moreover, the teacher's provision of timely feedback and adaptive instruction is vital in addressing the diverse needs of learners and sustaining their motivation and participation. This student-centered approach ultimately helps develop essential skills such as problem-solving, teamwork, and independent thinking (Phillip, 2005; Alves, 2017).

When compared with previous studies, the results of this study confirm the pedagogical value of integrating word cloud technology into grammar instruction. Participants noted that the visual and colorful nature of word clouds not only captured their interest but also aided in identifying parts of speech and modeling sentence structure, thereby enhancing their grammatical awareness (Rungruangthum & Pradaporn, 2020; Selvi, 2021). Nevertheless, some students encountered challenges related to technological compatibility, particularly when accessing word cloud tools via smartphones, which often presented limitations due to screen size or unstable connections.

In light of these findings, it is recommended that educators and instructional designers consider incorporating active learning within blended learning frameworks to cultivate a comprehensive, student-centered English curriculum. Furthermore, the instructional model examined in this study offers promising directions for enhancing grammatical competence through the integration of digital technologies, thereby enriching classroom instruction and promoting learner autonomy.

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