

EXPLORING THE USE OF ADAPTIVE LEARNING TECHNOLOGY IN HIGHER EDUCATION WRITING CLASSES: STUDENTS' PERSPECTIVES

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Abstract: This study investigates students' perspectives on using Adaptive Learning Technology (ALT) in writing classes in higher education. The ALTs used include Grammarly as an Automated Writing Evaluation (AWE), Quizizz as an Adaptive Content Application (ACA), and Google Docs and Miro as Digital Writing Platforms (DWP). Underpinning Bloom's Taxonomy, this mixed-methods research design combining a questionnaire adapted from Nguyen and Nguyen (2022), Gohar and El-Ghool (2016) as well as an observation checklist were employed to collect both quantitative and qualitative data on students' overall attitudes toward ALT, perceptions of its utility, satisfaction with its implementation, challenges, and recommendations. The findings indicate that students generally had a positive attitude towards ALT, particularly its capacity to provide personalized feedback and support for specific learning requirements. However, obstacles such as technical difficulties and the need for both students and teachers to receive adequate training and support must be addressed. The study additionally suggests several recommendations for the implementation of ALT in writing classes.

Keywords: Adaptive Learning Technology (ALT), students' perspectives, Bloom's Taxonomy, writing classes, higher education

1. Introduction

Nowadays, writing skills have become more critical than ever before (Gohar & El-Ghool, 2016; Nguyen & Nguyen, 2022; Zhou et al., 2012). The ability to write effectively is not only essential for academic success but also in professional and personal life. However, teaching and learning writing skills can be a challenging task for both teachers and students and Vietnam is not an exception. Writing classes are an essential component of language learning in Vietnam, with an emphasis on improving writing skills to meet the demands of academic and professional settings (Nguyen & Nguyen, 2022; Do et al., 2022). However, Vietnamese students face several challenges in writing classes, which can hinder their progress and motivation.

One major difficulty is the lack of opportunities for practicing writing skills (Pham, 2019, Nguyen & Nguyen, 2022; Nguyen, 2023). According to Hoang and Hoang (2022), Do et al. (2022) and Pham (2019), many students are required to focus on memorization and rote learning, with limited opportunities for creative expressions or critical thinking. As a result,

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they may struggle with generating ideas, organizing their thoughts, and crafting coherent written texts. Another challenge is the lack of exposure to authentic materials and contexts (Calma et al., 2022; Do et al., 2022). Many Vietnamese writing classes rely on textbook-based activities, which can be disconnected from real-world contexts and fail to engage students' interests (Nguyen, 2023). Additionally, Pham (2019) illustrates that the use of outdated materials and teaching methods may not align with current writing practices and standards. Furthermore, Nguyen and Nguyen (2022) advocate that the fear of making mistakes and the pressure to conform to strict grammar rules can inhibit students' creativity and motivation. Writing classes in Vietnam often prioritize grammar and sentence structure over content and style, leading students to focus on avoiding mistakes rather than developing their writing skills (Tran & Nguyen, 2021).

To address these challenges, the use of technology, such as Adaptive Learning Technology (ALT), can be implemented to promote student motivation, engagement, and input knowledge (Calma et al., 2022; Jing et al., 2023; Wen & Aziz, 2022; White, 2020). ALT provides students with personalized feedback on their writing, helping them to identify areas for improvement and develop their writing skills. Moreover, Oyanagi (2021) illustrates that the use of authentic materials and contexts can be incorporated into writing classes, fostering students' interest, and enabling them to connect with real-world writing practices. Overall, the difficulties faced by Vietnamese students in writing classes highlight the need for innovative and student-centered approaches to writing instruction. According to Pham (2019), the use of technology, such as ALT, can provide a powerful tool for promoting student motivation, engagement, and input knowledge, ultimately supporting students' development of writing skills in the technology era.

The analysis of the difficulties in writing classes in Vietnam has shed light on the challenges that students face in their pursuit of learning writing skills. Although ALT has been implemented at the higher education level, there are still concerns about the lack of attention given to students' perceptions and the need for teachers to adopt new teaching techniques. It is crucial to conduct research to investigate these issues further. By doing so, educators can better understand the challenges and opportunities of teaching and learning writing skills in the technology era, and explore ways to promote student motivation, engagement, and input knowledge in writing courses. Therefore, the researchers decided to conduct this research to investigate students' perceptions of the implementation of ALT in EFL writing courses, and a research question was addressed "*What are students' perceptions of using ALT in EFL writing classes?*"

2. Literature Review

2.1. Adaptive Learning Technology (ALT)

2.1.1. The Concepts of Adaptive Learning Technology

Adaptive Learning Technology (ALT) is a type of educational technology that uses data and algorithms to create personalized learning experiences for individual students (Munoz et al., 2022). Jing et al. (2023) and El-Sabagh (2021) state that it is a technology-based approach that seeks to tailor instruction to each student's unique needs, abilities, and learning preferences. The underlying idea behind ALT is that every student learns differently, and by using technology to gather data on each student's learning style and progress, the instruction can be adapted to fit the individual student (Daugherty et al., 2022).

According to Gohar & El-Ghool (2016), ALT is designed to provide students with a personalized learning experience that is tailored to their individual needs. It can adapt the content, pace, and level of difficulty of the instruction based on the student's progress, ensuring that they are challenged but not overwhelmed. This technology can also provide students with immediate feedback on their work, helping them to identify areas where they need to improve and providing them with specific suggestions for how to do so (Daugherty et al., 2022; El-Sabagh, 2021; Jing et al., 2023).

Jing et al. (2023), Munoz et al. (2015), and White (2020) share similar ideas that the main benefit of ALT is its ability to provide a personalized learning experience for each student, which can lead to increased engagement, motivation, and achievement. By providing students with content and instruction that is tailored to their needs and preferences, ALT can help them to take ownership of their learning and become more self-directed. Additionally, ALT can help to identify students who are struggling early on and provide them with the support they need to succeed (Jing et al., 2023; Daugherty et al., 2022). However, there are also some concerns about the use of ALT. Critics argue that ALT can be expensive to implement and that it may not be effective for all students or in all contexts (Jing et al., 2023; Ovanagi, 2021; Wen & Aziz, 2022). Additionally, there are concerns about the use of data and algorithms to make decisions about student learning, and the potential for bias and discrimination in these processes.

In conclusion, ALT is a technology-based approach to education that seeks to tailor instruction to each student's unique needs, abilities, and learning preferences. It has the potential to provide students with a personalized learning experience that can lead to increased engagement, motivation, and achievement. Nevertheless, the effectiveness and ethical implications of this technology are still being debated (Daugherty et al., 2022; El-Sabagh, 2021; Jing et al., 2023; Chan & Nguyen, 2021), and further research is needed to fully understand its impact on teaching and learning.

2.1.2. Types of Adaptive Learning Technology

There are several different types of ALT, depending on the specific approach, methodology, and technology used.

According to Hockly (2018), *Automated writing evaluation (AWE)* is regarded as useful to develop writing skills. It uses artificial intelligence and machine learning techniques to provide a personalized learning experience. AWE can provide immediate feedback, identify areas of weakness, and provide targeted instruction to help students overcome specific challenges (Dizon & Gayed, 2021; Bailey & Lee, 2020; Ebadi et al., 2022).

Hockly (2018), Bailey and Lee (2020) clarify that AWE refers to the use of computer software to automatically evaluate and score written texts. AWE tools are designed to provide feedback on various aspects of writing, such as grammar, spelling, vocabulary, and coherence. The feedback can be used to help learners identify areas for improvement and to develop their writing skills.

One of the popular AWE tools is Grammarly, which is an online writing tool that checks grammar, spelling, punctuation, and style (Dizon & Gayed, 2021; Bailey & Lee, 2020; Ebadi et al., 2022). Grammarly uses advanced algorithms and natural language processing to detect errors and suggest corrections. It can be used by learners of all levels, from beginner to advanced, and it is available as a browser extension, desktop app, or mobile app. The use of Grammarly can provide several benefits for language learners. First, it can save time and effort for teachers who would otherwise have to manually correct and provide feedback on student

writing. Second, it can help learners identify and correct errors in their writing, which can improve their overall writing skills. Third, it can provide personalized feedback to learners based on their individual strengths and weaknesses, which can help them focus on specific areas for improvement. Finally, it can provide learners with immediate feedback, which can increase their motivation and engagement in the writing process.

Park and Lee (2004) demonstrate that *Adaptive content application (ACA)* is a term used to describe content that is tailored to meet the specific needs of the user. This type of content, according to Lim and Yunus (2021), is designed to adapt and change based on the user's behavior, preferences, and interests. Adaptive content is often used in e-learning and educational contexts, where it is used to deliver personalized learning experiences to students. In a similar view to Lim and Yunus (2021), Wen and Aziz (2022), Quizizz is an adaptive content application that allows teachers to create and deliver engaging and interactive quizzes to students. This platform offers a wide range of features that enable teachers to customize their quizzes and create adaptive content that meets the unique learning needs of each student (Nguyen et al., 2021).

One of the key features of Quizizz as an adaptive content application is that it is dynamic and responsive, changing in real-time based on the user's interactions (Nguyen et al., 2021; Wen and Aziz, 2022). This means that as the user engages with the content, the system can adapt and modify the content to meet their specific needs. According to Pertiwi (2020), Quizizz helps to personalize learning paths for individual students. Teachers can assign specific quizzes based on the student's performance on previous quizzes or based on their learning goals. In other words, the teaching and learning content on Quizizz can be easily modified and updated, allowing for continuous improvement and adaptation. This feature ensures that students are receiving personalized instruction that meets their individual needs, rather than a one-size-fits-all approach. Moreover, Lim and Yunus (2021) illustrate Quizizz also allows teachers to monitor student progress and track their performance over time. This feature enables teachers to identify areas where students are struggling and adjust their instruction to meet their needs. Additionally, teachers can use the data from Quizizz to inform their instructional decisions and make data-driven decisions that promote student learning.

Digital writing platforms (DWP) have become increasingly popular in recent years, offering students and educators the ability to collaborate and create written content in a virtual environment. Two popular examples of digital writing platforms are Google Docs and Miro (Do et al., 2022; Hoang & Hoang, 2022, Nguyen, 2023; Pham, 2019; Zhou et al., 2012).

According to Zhou et al. (2012), Nguyen and Nguyen (2023), Google Docs is a cloud-based word-processing application that allows users to create, edit, and share documents online. The platform offers several features that support collaborative writing, such as real-time editing, commenting, and chat functions (Pham, 2019; Hoang & Hoang, 2022). Nguyen (2023) supports that these features enable students to work together on written assignments, provide feedback to one another, and engage in discussions about the content.

Miro, on the other hand, is a digital whiteboard platform that allows users to collaborate and brainstorm ideas in a visual format (Do et al., 2022). While not specifically designed for writing, Miro can be a useful tool for students to map out their ideas and organize their thoughts before starting to write. The platform also allows for real-time collaboration, enabling students to work together to develop their ideas and refine their written content.

Both Google Docs and Miro offer benefits for digital writing and collaboration in educational settings. The use of these platforms can foster greater student engagement and

motivation, as well as provide opportunities for peer feedback and collaboration. Moreover, the accessibility and convenience of these tools make them an excellent choice for remote or hybrid learning environments.

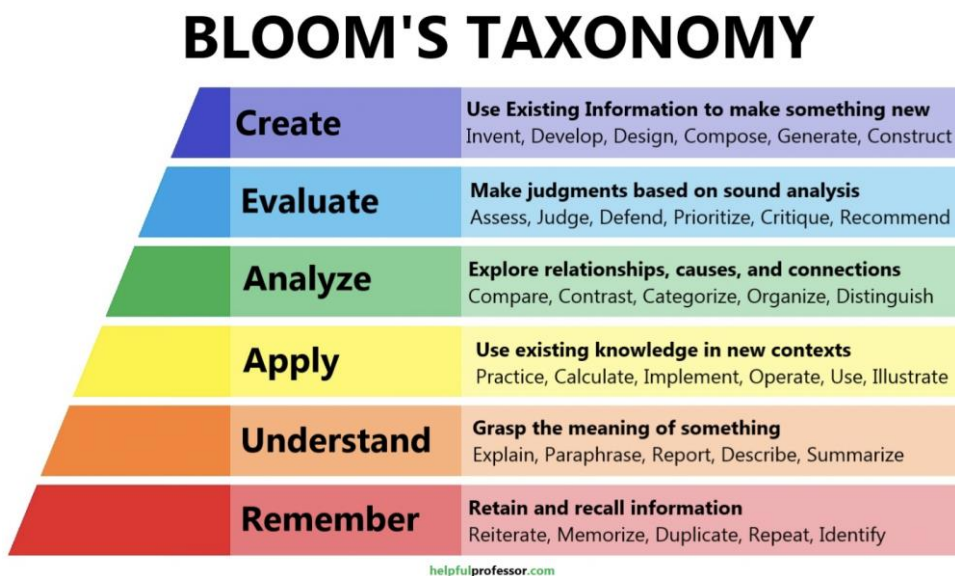
In a nutshell, AWE tools like Grammarly have demonstrated the effectiveness in providing immediate feedback, identifying areas for improvement and offering targeted instruction for learners. Additionally, ACA apps like Quizizz enable personalized learning experiences by adapting and changing content based on user interaction. Furthermore, DWP such as Google Docs and Miro offer collaborative environments that enhance student engagement, foster feedback and support idea generation and organization. Therefore, considering the relationship between writing skills and technology, it is recommended to apply ALT in the form of Grammarly, Quizizz, Google Docs, and Miro. By incorporating these technological tools, writing classes can address the challenges faced by Vietnamese students and promote the development of their writing skills in academic and professional contexts.

2.2. Theoretical Framework: Bloom Taxonomy

ALT has the potential to transform EFL writing classes by providing individualized instruction, immediate feedback, and personalized learning paths (Daugherty et al., 2022; El-Sabagh, 2021; Gohar & El-Ghool, 2016). However, to effectively implement ALT in EFL writing classes, a theoretical framework is necessary to guide instructional design and ensure that learning outcomes align with students' needs and goals. One possible framework is Bloom's taxonomy (cited in Drew, 2023), which provides a hierarchy of cognitive processes that students can develop through writing. Figure 1 demonstrates Bloom's taxonomy.

Figure 1

Bloom's Taxonomy (1956) (cited in Drew, 2023, extracted from helpfulprofessor.com)



At the lowest level of Bloom's taxonomy are basic skills such as remembering and understanding, which can be enhanced through ALT tools that provide immediate feedback on grammar and vocabulary. According to White (2020), ALT can also support the development of higher-order thinking skills such as analysis, evaluation, and synthesis, which are necessary for effective writing. By providing personalized learning paths, ALT can help students progress through Bloom's taxonomy at their own pace, building on their existing knowledge and skills

to achieve higher levels of proficiency.

Moreover, ALT can support the development of metacognitive skills, which are critical for successful writing. Metacognition involves the ability to reflect on one's own learning and to monitor and regulate cognitive processes. By providing immediate feedback and personalized learning paths, ALT can help students develop metacognitive skills, such as self-assessment and goal setting, which can enhance their writing performance.

In summary, the use of ALT in EFL writing classes can be guided by Bloom's taxonomy as a theoretical framework. By aligning instructional design with Bloom's taxonomy, ALT can support the development of basic skills as well as higher-order thinking skills and metacognitive skills. Ultimately, this can lead to improved writing performance and greater student engagement and motivation.

2.3. The Use of Adaptive Learning Technology in EFL Writing Courses

2.3.1. Benefits of Adaptive Learning Technology Implementation in EFL Writing Classes

The implementation of ALT in English as a Foreign Language (EFL) writing classes can bring numerous benefits.

Firstly, ALT can enhance EFL writing instruction by providing students with personalized feedback, fostering autonomous learning, and addressing individual learning needs (Bailey & Lee, 2020; White, 2020). By analyzing students' writing patterns, ALT can provide customized activities and feedback, allowing students to focus on their weak areas and work at their own pace. This personalized approach can significantly improve students' writing skills and overall achievement.

Secondly, the potential impacts of ALT on student motivation, engagement, and achievement are significant (Zhou et al., 2012). Do et al. (2020) advocate that ALT can create a more interactive and engaging learning environment, allowing students to receive immediate feedback and encouraging them to take ownership of their learning process. This can lead to increased motivation and a higher level of engagement in writing tasks, as students can see the immediate results of their efforts. Furthermore, the use of ALT can provide students with a sense of accomplishment, as they can track their progress and see their writing skills improving over time (Oyanagi, 2021; Nguyen, 2023).

Thirdly, the formative assessment supports provided by ALT can lead to more individualized instruction. ALT can analyze students' writing patterns and provide teachers with real-time data on their strengths and weaknesses (Do et al., 2022). This data can be used to tailor instruction to individual student needs, providing more targeted support and allowing teachers to focus on areas where students need the most help. This personalized approach can lead to more efficient use of instructional time and better outcomes for students.

In summary, the implementation of ALT in EFL writing classes can bring numerous benefits, including enhancing EFL writing instruction, impacting student motivation, engagement, and achievement, and providing formative assessment supports for more individualized instruction. By using ALT to support EFL writing instruction, teachers can create a more personalized and engaging learning environment that fosters students' writing skills and overall achievement.

2.3.2. Challenges of Adaptive Learning Technology Implementation in EFL Writing Courses

The implementation of ALT in EFL writing courses brings various challenges that need to be addressed for effective integration. One significant challenge is technical and logistical issues, such as the need for reliable internet access and appropriate hardware and software. These technical challenges can limit the accessibility and effectiveness of ALT, especially in areas with limited technological infrastructure (Nguyen et al., 2021; Pertiwi, 2020; Lim & Yunus, 2021).

Another challenge is the pedagogical aspect, which involves the need for appropriate content and activities that align with the course objectives and learning outcomes. Additionally, the use of ALT requires a balance between technology and traditional instruction, which can be challenging for teachers who are not familiar with technology or traditional instruction. Furthermore, ALT may not always align with the teaching styles or preferences of teachers, which can result in resistance to adoption (Do et al., 2022).

Apart from technical and pedagogical challenges, several factors affect the successful implementation of ALT. These factors include students' and teachers' attitudes towards technology, institutional support for ALT integration, access to training and resources, and the availability of ALT software that meets the needs of the course objectives and learning outcomes (Bailey & Lee, 2020). Therefore, addressing these challenges requires collaborative efforts from various stakeholders involved in EFL writing instruction.

2.4. Previous Studies

The rapid progression of technology has opened up new avenues in language education, particularly in the realm of teaching writing (Bailey & Lee, 2020; Dizon & Gayed, 2021; Do et al. 2022; Jing et al., 2023). Lim and Yunus (2021) support that a plethora of digital tools and platforms have emerged as valuable resources for enhancing students' writing abilities. Notably, Grammarly, Quizizz, Google Docs, and Miro have garnered considerable attention as efficacious tools for supporting language learners in their writing endeavors. The following part aims to delve into potential benefits and applications of these tools in language classrooms, shedding light on their role in providing automated writing evaluation, adaptive content delivery, and digital collaboration. By scrutinizing previous studies and their findings, the researchers can glean valuable insights into how these tools can contribute to the improvement of writing skills in English language learning contexts.

Ebadi et al. (2022), Bailey and Lee (2020), and Dizon and Gayed (2021) investigate the effects of utilizing Grammarly in a variety of language learning contexts. Ebadi et al. (2022) discover that using Grammarly improve the quality of EFL articles written by Iranian students, specifically in terms of grammatical accuracy and fluency. Bailey and Lee (2020) discover that while the use of Grammarly has some favorable effects on language accuracy and complexity in writing based on tests and textbooks, there is no significant improvement in Facebook-based writing. Dizon and Gayed (2021) discover that using Grammarly significantly improves the quality of mobile second language writing, particularly in terms of grammatical and orthographical accuracy. In general, the studies indicate that Grammarly can be a useful instrument for enhancing language precision and quality in a variety of language learning contexts.

Several studies investigate the effects of the online learning and assessment instrument Quizizz on various aspects of language acquisition. Nguyen et al. (2021) examine the effects of

Quizizz on the vocabulary achievement of EFL students and discover that the use of Quizizz significantly increases students' vocabulary scores. In addition, learning quiz on this apps enables students to think critically and make instant decision. Wen and Aziz (2022) conduct a systematic review of the literature on the use of Quizizz as an online teaching and learning assessment tool in an ESL classroom and conclude that Quizizz can increase student engagement and motivation, promote self-directed learning, and facilitate formative assessment. Lim and Yunus (2021) conduct a systematic review of teachers' perceptions regarding the use of Quizizz in the teaching and learning of English and discover that teachers have generally positive perceptions of Quizizz, particularly regarding its potential to increase students' engagement and participation in the learning process. Pertiwi (2020) examines the students' perspectives on the use of Quizizz as an English-learning assessment instrument. Observations, interviews, and documentation are utilized to collect data for this qualitative study. The results indicate that the students view Quizizz positively, viewing it as a medium for learning and assessing English due to its appealing appearance. Overall, these studies suggest that Quizizz can be an effective tool for teaching and assessing English language learning, as it is perceived as an attractive and engaging medium for learning. However, more research is needed to fully understand the potential of Quizizz and its impact on language learning outcomes.

In terms of Google Docs and Miro, several educators have explored the use of those digital applications in language classrooms, highlighting their potential to enhance student engagement, facilitate feedback and streamline the writing process. Zhou et al. (2012) evaluate Google Docs for collaborative writing outside the classroom. Undergraduates were arbitrarily assigned to small groups to complete two out-of-class assignments using Google Docs and one task without the application. Prior to the survey, the majority of students were unfamiliar with Google Docs, yet 93% found it beneficial for collaborative work. Students' paper grades were unaffected by Google Docs, and half of them said they would use it again. According to the research, Google Docs facilitated student learning and collaboration. The research of Nguyen (2023) examines the use of Google Docs in collaborative writing and students' perceptions of it in writing courses. For the investigation, 21 freshman English majors completed surveys and writing exercises. Google Docs had no effect on the collaborative writing grades of students, but they enjoyed using it. Additionally, low-level students were taught technology and social skills. Students also mentioned excessive costs, internet issues, and Google document processing problems on mobile devices. Pham (2019) conduct an exploratory multiple-qualitative case study with twelve students working on an argumentative essay and a medical report in three groups of four. In each challenge, each group had its own interaction pattern, with distinct language functions, contributions, and scaffolding strategies. Due to ambiguous findings, it was impossible to determine the influence of assignment types on student interaction, and student cooperation had no effect on writing quality. Interviews with students revealed that Google Docs facilitated collaborative writing and learning. Hoang and Hoang (2022) investigate the impact of frequent Google Docs collaboration on the English academic writing skills of Vietnamese high school students enrolled in an online EFL academic writing course. 24-person mixed-methods study. Between pre- and post-tests, students' academic writing skills increased. However, neither cohesion and coherence nor grammatical breadth and correctness improved significantly. Students enjoyed interacting on the website but also found it useful for writing. The survey also revealed problems with student Google Docs collaboration. The study suggests further investigation. Do et al. (2022) conduct an action research study to determine the efficacy of using peer feedback activities on Miro applications

to enhance the peer correction competency of higher education students. Thirty third-year English majors participated in the ten-week intervention, and their essays were reviewed by their peers on Miro. Peer reviewing had a positive effect on the frequency of errors found in student papers, and students' writing skills also improved. Positive student attitudes toward peer evaluation and the use of Miro for peer correction were also disclosed by qualitative results. However, the study demonstrated students' difficulties in controlling the movement of their space on the platform or unintentionally duplicating their writing notes. As a consequence, both teachers and students sometimes found it confusing to navigate and interpret the information on the board. In a nutshell, these studies share commonalities, including investigating technology use namely Google Docs and Miro for language learning, utilizing mixed-methods research designs, involving English as a foreign language learner, assessing the effectiveness of technology-mediated writing activities, observing improvements in writing skills, and providing pedagogical implications for language educators and researchers. They have reported similar results regarding the effectiveness of Google and Miro in enhancing students' writing skills. The studies found that the use of technology had a positive impact on students' writing abilities. They showed improvements in students' writing skills after participating in technology-mediated activities with Google Docs and Miro. Specifically, peer feedback and collaboration using Google Docs and Miro were found to be beneficial for students' writing development.

The literature review highlights the significance of writing skills in the current technology era and the challenges faced by EFL learners in writing classes in Vietnam. The use of ALT in EFL writing courses can be a potential solution to address these challenges and promote student motivation, engagement, and input knowledge. Key features of ALT include individualized instruction, immediate feedback, and personalized learning paths. However, the implementation of ALT in EFL writing classes faces several challenges, including technical and logistical issues, pedagogical challenges, and factors affecting successful implementation. Despite these challenges, the benefits of ALT implementation include enhancing EFL writing instruction, potential impacts on student motivation, engagement, and achievement, and support for formative assessment and individualized instruction. While there has been considerable research on the use of ALT in language learning, there is still a research gap regarding students' perceptions of using ALT, specifically in writing classes. Previous studies have primarily focused on the impact of ALT on language learning outcomes, such as improved grammar accuracy, vocabulary acquisition or writing performance. Limited attention has been given to understanding how students perceive and experience the use of these tools in the context of writing instruction. Reasonably, understanding students' perceptions of using ALT allows the researchers to gain insights into students' attitudes, motivations and engagement levels when using ALT tools for writing tasks. Furthermore, exploring students' perceptions helps identify any challenges or barriers they may encounter when using ALT tools for writing. In the following methodology section, a research design will be proposed to investigate the perceptions of students on the implementation of ALT concerning the use of Grammarly, Quizziz, Google Docs, and Miro in EFL writing classes.

3. Methodology

3.1. Setting and Participants

The authors conducted this current study at a public university in Hanoi, Vietnam among 116 English majors. The participants included 41 males and 75 females between the ages of 18

and 20. The students were considered to be at the pre-intermediate level, and their coursebook was *Great Writing 2* by Keith Folse, published by National Geographic. The selected university and participants represent a representative sample of English language learners in Vietnam's higher education setting. The pre-intermediate level is a crucial stage in English language acquisition, and the *Great Writing 2* coursebook is globally used in English language programs. These specifics facilitate a clear comprehension of the study's setting and the participants involved.

The participants come from diverse backgrounds and have different learning styles. They all had to pass an entrance exam to enter the university, revealing that they have a certain level of academic ability. However, many of them faced difficulties in writing as they were only taught grammar for testing and examination at high school. Additionally, they tended to depend heavily on essay samples and often resorted to imitation or copying. This suggests that the participants may have limited experience and confidence in writing, making it all the more important to explore how they perceive ALT in improving their writing skills. Furthermore, the participants and context information provide a specific context for the study and highlights the potential for the use of ALT in similar settings.

3.2. Research Design

To address the research gap and gain a comprehensive understanding of students' perceptions of using ALT in writing classes, a mixed-method research design would be suitable. This design combines qualitative and quantitative approaches, allowing for a more holistic and nuanced exploration of the research topic (Creswell, 2014). The quantitative component of the research design would involve the administration of questionnaires or surveys to a large sample of students. Besides, the research design would incorporate qualitative methods to capture in-depth and contextual information. The combination of quantitative and qualitative data in a mixed-method design would provide a complementary perspective and a more comprehensive view of students' perceptions of ALT in writing classes. By integrating these two approaches, the researchers can triangulate the findings and provide a more robust and comprehensive analysis of students' perceptions (Creswell, 2014).

3.3. Data Collection Instruments

This study's methodology involved a two-step procedure. The initial phase consisted of administering a questionnaire to explore students' perceptions of ALT. The second stage involved observing students' use of ALT in writing classes.

3.3.1. Questionnaire

According to Creswell (2014), questionnaires are a popular tool used in scientific research to gather data from a large group of people either online or in paper form. Merriam and Tisdell (2015) clarify questionnaires are a cost-effective way to gather large amounts of data when compared to other data collection methods. Reasonably, a questionnaire was deployed the first research instrument to gather quantitative data about students' perceptions and attitudes toward ALT. The questionnaire was adapted from Gohar and El-Ghool (2016) and Nguyen and Nguyen (2022), which includes 20 items of four main parts including overall attitude towards ALT, perceptions of the ALT utility, satisfaction with the implementation of ALT, and challenges of using ALT in EFL writing classes. The questionnaire used a 5-point Likert scale (ranging from Strongly Disagree to Strongly Agree) with closed-ended questions to provide a clear and structured format for students to express their opinions. By adapting the

questionnaire from previous studies, the researchers ensured either the validity or reliability of the instrument, while also tailoring it to the specific context.

Moreover, the use of a bilingual version of the questionnaire can help to avoid bias and misunderstanding during the collecting data process. As the participants are English-major students, they likely have a good command of English. However, there may be some technical terms or phrasing in the questionnaire that could cause confusion or misinterpretation. By providing a bilingual version, participants can read the questions and answer options in both English and their native language, which can ensure that they fully understand the questions and can provide accurate responses. Additionally, providing a bilingual version can also help to address any potential language barriers or limitations in the participants' English proficiency. This can increase the validity and reliability of the data collected and ensure that the findings accurately reflect the participants' attitudes and perceptions toward the use of ALT in writing skills. Concerning the reliability of the questionnaire, Cronbach's alpha is a measure of internal consistency, indicating how closely related a set of items is as a group (Creswell, 2014). A value of 0.73 indicates an acceptable level of internal consistency for the items on the questionnaire.

3.3.2. Observation Checklist

The observation checklist used in the current study aimed to complement the data gathered from the questionnaire and supply a more in-depth understanding of the challenges faced by students when using ALT in their writing classes. The checklist consisted of both closed and open-ended questions and covered topics such as technical issues, user interface, training and support, integration with the writing lessons, affordability, and overall challenges. The close-ended questions allowed for easy quantification and data analysis, while the open-ended questions provided rich and detailed information that might have been missed by the questionnaire.

By using both the questionnaire and the observation checklist, the study was able to triangulate the data, which means that the researchers were able to compare and contrast the findings from both sources to arrive at a more complete and accurate understanding of the research question (Creswell, 2014). Triangulation of data, according to Merriam and Tisdell (2015), is important in research as it increases the credibility and validity of the findings, as well as enhances the reliability of the results. In this study, the use of both the questionnaire and the observation checklist allowed for a comprehensive understanding of the challenges faced by students when using ALT in their writing classes, which enables to improve the implementation of ALT in similar contexts.

The fact that different versions of the observation checklist were discussed, evaluated, and re-designed among five other colleagues is a fundamental aspect of the study's methodology. This process ensures that the checklist is reliable, valid, and able to capture all relevant aspects of the research question (Merriam & Tisdell, 2015). By involving multiple colleagues, the researchers can obtain different perspectives and ideas on how to improve the checklist, which can lead to a more comprehensive and effective tool. This also helps to avoid any potential biases or limitations that might arise from a single researcher's perspective (Creswell, 2014). Collaboration among colleagues is also in line with good research practice, as it promotes transparency and helps to ensure the quality of the research findings.

To collect data from the observation checklist, the researchers conducted observations in two writing classes over a period of eight weeks. The classes were held twice a week, allowing for regular and consistent data collection. During each class period, the researchers

actively observed the students' interaction with ALT tools while they engaged in writing activities. They carefully monitored the students' use of the tools, paying attention to their experience including ALT's utility, challenges related to technical issues, user interface, training and support, their satisfaction with the implementation of ALT; overall engagement and any other relevant factors outlined in the checklist. The checklist served as a guide to ensure that all pertinent aspects of the students' experiences with ALT were captured during the observation process. By observing multiple class periods each week, the researchers had the opportunity to witness the students' progression, observe any patterns or changes in their experiences, and gather a substantial amount of data for analysis.

3.4. Data Analysis

The data collected from the questionnaire were interpreted using descriptive statistics. The responses from the questionnaire were analyzed using frequency distribution tables and percentages to determine the students' attitudes, perceptions, and challenges towards adaptive learning technology in writing skills. The Likert scale responses were analyzed via SPSS version 25.0, using mean and standard deviation to determine the level of agreement or disagreement of the students towards each item.

Thematic analysis is a qualitative data analysis technique that identifies, analyzes, and reports data patterns or themes (Braun & Clarke, 2006). The procedure consists of identifying themes or patterns across data, classifying the data into themes, revising, and refining the themes, and then analyzing and interpreting the data in light of the classified themes. The qualitative data from observation questionnaires were analyzed employing thematic analysis in this study. To identify recurring patterns, themes, and categories, the data were transcribed and read multiple times. The information was then coded into themes and categories, which were reviewed and refined, and subsequently analyzed in accordance with the research questions and objectives. The analysis was then presented and discussed in relation to the objectives and queries of the study. The observation data were analyzed qualitatively by categorizing the responses based on the identified themes and subthemes. The themes included technical issues, user interface, training and support, integration with the writing lessons, affordability, and overall challenges. The open-ended questions were synthesized using content analysis to identify common themes and patterns.

3.5. The Reliability and Validity of the Study

The present study thoroughly assessed the reliability and validity of the research design and data collecting techniques to uphold the integrity of the results.

Reliability pertains to the degree of consistency and stability shown by the study design and methodologies used (Creswell, 2014). In order to bolster the dependability of the research, a mixed-methods methodology was used, encompassing the utilization of both quantitative and qualitative data gathering techniques. The use of this methodology facilitated the process of triangulation, whereby data obtained from various sources were systematically compared and contrasted in order to assure coherence and reliability in the research outcomes. Furthermore, the observation checklist used in the study underwent a meticulous design process and underwent rigorous assessment by many colleagues to ascertain its trustworthiness in collecting pertinent facets of the research inquiry.

Validity, in addition, refers to the precision and credibility of the study's results in accurately representing the desired research constructs (Creswell, 2014). The questionnaire included in the research was modified from previously conducted studies, therefore enhancing

content validity via the inclusion of pertinent factors related to students' perspectives of using ALT in writing courses. The inclusion of the observation checklist in the study enhanced the construct validity by facilitating the collection of real-time data on students' engagement with ALT tools in the context of writing classes.

Moreover, the research used a purposive sampling technique to ensure the selection of participants who accurately represented the intended community, so augmenting the study's external validity. Comprehensive explanations of the study setting, individuals involved, and methodologies used were included, enhancing transparency and facilitating readers in evaluating the applicability of the results to comparable circumstances.

Overall, the study's emphasis on ensuring methodological rigor, using data triangulation, and meticulously adapting measuring methods enhanced the reliability and validity of the research, hence bolstering the credibility and trustworthiness of the study's findings.

3.6. Ethical Issues

In any research study involving human participants, it is crucial to consider ethical concerns. In this study, several ethical considerations were taken into account. First and foremost, the researchers obtained informed consent from all participants. Participants were informed about the objectives, the research procedure, and their rights as participants. They were also assured of the confidentiality of their data and their right to withdraw from the study at any time.

The researchers also ensured that the study did not cause any harm or discomfort to the participants. They were careful not to ask sensitive or intrusive questions in the questionnaire and to avoid any observation that could make students feel uncomfortable. The researchers also made sure to protect the anonymity of the participants by not asking for any identifying information and by keeping their data confidential.

Additionally, the researchers followed ethical guidelines for data analysis, ensuring that they accurately represented the views and opinions of the participants without misrepresenting or distorting their responses. They also gave credit to the sources used, ensuring that all ideas and concepts were properly cited and acknowledged. Overall, the ethical considerations taken in this study ensured the protection and respect of the participants' rights and well-being.

4. Findings and Discussions

The tables below present the results of a survey conducted to explore students' perceptions of the use of ALT in EFL writing courses. The data was analyzed using mean scores and standard deviation.

4.1. Students' Overall Attitude Toward ALT

The integration of ALT in EFL writing courses has gained momentum for a few decades, as it is considered a promising solution to improve students' writing skills. Table 1 displays students' overall attitude toward the use of ALT to teach writing skills.

Table 1*Students' Overall Attitude Toward the Use of ALT in EFL Writing Course*

	Disagree (%)	Neutral (%)	Agree (%)	Min	Max	Mean	Std. Deviation
I find ALT to be a useful tool for improving my writing.	3.4	16.7	79.9	2	5	3.97	.716
I find ALT easy to use.	7.2	78.2	14.5	2	4	3.08	.460
ALT provides personalized feedback that is helpful for my writing.	11.7	78.9	9.4	2	4	2.98	.457
ALT has increased my motivation to write.	3.9	27.7	68.4	2	5	3.76	.680
I would recommend the use of ALT to other EFL writing students.	2.6	7.7	89.7	2	4	3.89	.368

The findings reveal that the majority of students (79.9%) agreed that ALT is a useful tool for improving their writing, with $M=3.97$ and $SD=.716$. This positive response indicates that students acknowledged the potential benefits of incorporating technology into their writing classes. However, only 14.5% of students found ALT easy to use, with a mean score of 3.08, indicating the importance of considering user-friendly interfaces and providing adequate training and support to ensure that students can effectively navigate and utilize ALT. Additionally, only 9.4% of students agreed that ALT provides personalized feedback that is helpful for their writing, with $M=2.98$. This suggests that there may be room for improvement in the feedback mechanism employed by ALT tools. In terms of motivation, 68.4% of students agreed that ALT has increased their stimulation to write, with $M=3.76$. Finally, the majority of students (89.7%) agreed that they would recommend the use of ALT to other EFL writing students, with $M=3.89$ and $SD=.368$. This high level of endorsement signifies a positive overall perception of ALT among the participants. Their positive experiences and satisfaction with the technology's potential benefits suggest that ALT can be a valuable resource in EFL writing instruction.

It is important to crosscheck students' overall attitude toward ALT implementation in EFL writing classes through various methods such as a questionnaire and observation checklist. While some students may show enthusiasm and actively participate in writing activities and discussions, others may express negative comments about ALT, noting from the observation sheet such as “*slow connection disrupted the writing process, much time to navigate the tools, someone tech-savvy, different interface and feature*”. The reasons for such negative comments could be due to technical difficulties, a lack of familiarity with the platform, or discomfort with the use of technology for learning purposes. Teachers need to address these issues and provide appropriate support and training to help students overcome these challenges. By gathering data through multiple methods, teachers can gain a more comprehensive understanding of students' attitudes and experiences with ALT in writing classes, which can inform future instruction and implementation.

4.2. Students' Perspectives of the ALT's Utility

The following analysis examines students' perceptions of the ALT's utility. Table 2 demonstrates issues related to error identification, informative feedback, examples, and

explanation, as well as interactive exercises.

Table 2

Students' Perspectives of the ALT's Utility

	Disagree (%)	Neutral (%)	Agree (%)	Min	Max	Mean	Std. Deviation
ALT helps me identify areas where I need to improve my writing.	5.1	12.9	82	2	5	4.08	.793
ALT provides useful feedback on my word choice, grammar, and sentence structure.	12.7	74.4	12.9	1	5	2.99	.597
ALT's use of examples and explanations helps me understand writing concepts better.	14.8	53.3	31.9	2	5	3.22	.744
ALT's practice exercises or quizzes help me reinforce my writing knowledge and skills.	13.7	62.4	23.9	2	5	3.13	.640

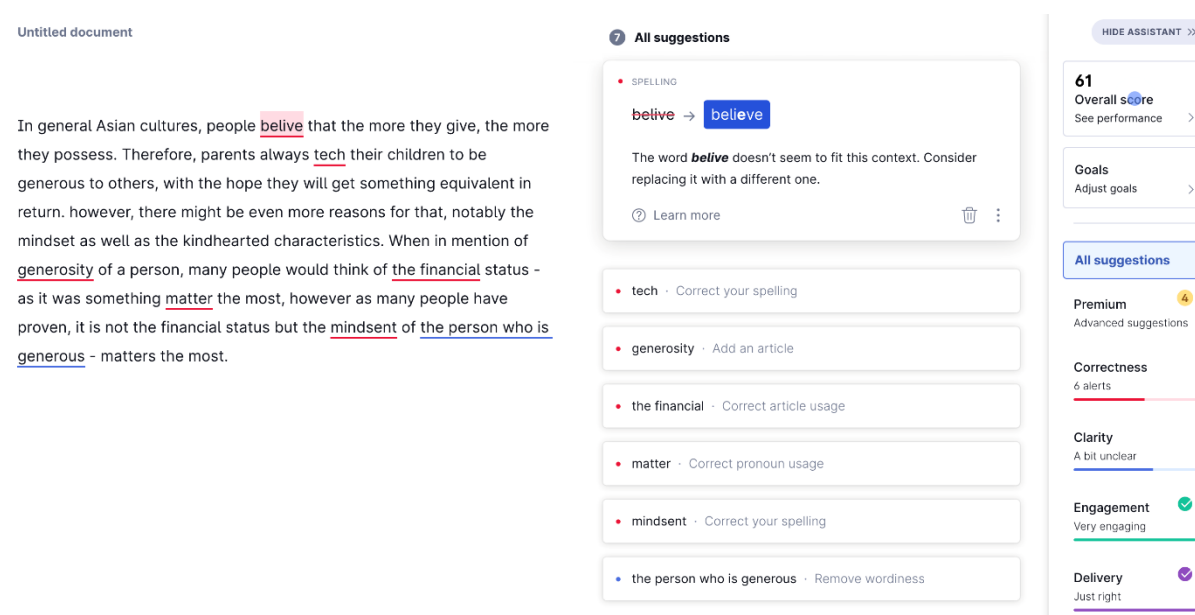
The majority of the students (82%) agreed that ALT helps them identify areas for improvement in their writing ($M=4.08$, $SD=.793$), which indicates that students perceived the tools as effective in providing feedback and guidance for enhancing their writing skills. A significant percentage (74.4%) expressed a neutral stance regarding the usefulness of ALT's feedback on their word choice, grammar, and sentence structure ($M=2.99$, $SD=.597$). This suggests that while some students may find the feedback helpful, a considerable number of students may not perceive it as valuable or informative. In addition, a substantial portion of students (53.3%) remained neutral regarding ALT's use of examples and explanations to enhance their understanding of writing concepts ($M=3.22$, $SD=.744$). This indicates a lack of consensus among students regarding the effectiveness of these features in facilitating comprehension and learning. Regarding the effectiveness of ALT's practice exercises or quizzes in reinforcing their writing knowledge and skills, more than half of the students expressed an undecided standpoint ($M=3.13$, $SD=.640$). The findings suggest a mixed perception among students regarding the impacts of ALT in various aspects of writing improvement. While there is a strong agreement that ALT helps identify areas for improvement, the feedback, the use of examples and explanations, and practice exercises received more neutral responses. These findings highlight the need for further exploration and improvement in the design and implementation of ALT devices to better cater to students' needs and enhance their writing abilities.

Accordingly, observation analysis confirms that ALT provided rapid feedback on writing is consistent with the fact that installing Grammarly on students' computers instantaneously corrected and highlighted their writing errors in red. Figure 2 illustrates students' writing errors recognized by Grammarly.

The fact that the app also provided corrections is further evidence that ALT could be used to provide individualized lessons to students. In the literature review, the influence of ALT on student motivation and engagement was acknowledged, and this is consistent with the fact that writing-related questions in Quizizz motivate students to think critically and make decisions (Nguyen et al., 2021).

Figure 2

An Example of Students' Writing on Grammarly



4.3. Students' Satisfaction with the Implementation of ALT

The previous part has explored students' overall attitude and satisfaction with ALT implementation in EFL writing courses. The following analysis will highlight students' opinions about the effectiveness of ALT's integration into the course, the clarity of instructions, the timeliness of feedback, the teacher's support for using ALT and overall satisfaction.

Table 3

Students' Satisfaction with the Implementation of ALT

	Disagree (%)	Neutral (%)	Agree (%)	Min	Max	Mean	Std. Deviation
ALT is integrated effectively into the writing course.	21.5	64.6	13.9	2	4	2.92	.592
The instructions for using ALT are clear and easy to follow.	8.5	27.7	63.8	2	5	3.61	.732
ALT provides timely feedback on my writing.	17.2	11.9	70.9	2	5	3.67	.912
The teacher provides adequate support for using ALT.	12.2	24.8	62.8	2	4	3.51	.704
I am satisfied with the implementation of ALT in the writing course.	6.8	23.4	69.8	2	5	3.75	.756

Table 3 demonstrates that students regarded the use of ALT positively in their writing class. The majority of students (64.6%) had a neutral stance on the effectiveness of ALT

integration into the writing course, but a notable proportion (21.5%) disagreed (M=2.92, SD=.592). The mean score for the statement "I am satisfied with the implementation of ALT in the writing course" was 3.75, indicating that students were satisfied with the implementation of ALT in their writing course. However, qualitative analysis from observation seems to contrast the quantitative data. Students appeared to view the integration of ALT into their writing class as effective with some notes from observation such as "interesting than paper-based exercises, be fast to give answers". They were more confident when writing on Google Docs and Miro. In addition, the students tended to be enthusiastic about the use of the Quizizz games, suggesting that the gamification of learning activities might be an effective method for engaging students with ALT. The qualitative analysis indicates that the students appeared to view the integration of ALT as effective, particularly when using platforms such as Google Docs and Miro. This increased confidence in using these platforms may indicate that students find them more user-friendly and intuitive compared to other aspects of ALT. The quantitative data, on the other hand, presents a different perspective, with a notable percentage of students expressing disagreement or neutrality regarding the effectiveness of ALT integration. This disconnect could be attributed to various factors, such as the limitations of the data instrument or the possibility that students' opinions vary based on specific aspects of ALT.

With a mean score of 3.61, "The instructions for using ALT are clear and easy to follow" has the highest quality of life rating. This indicates that the ALT user manuals were beneficial and easily understood by students. The average score for the statement "ALT provides timely feedback on my writing" was the lowest (3.67 out of 5). Some students appeared to believe that they did not receive timely feedback on their written assignments. Observational data confirms that students rarely requested re-instruction and that they received timely feedback on their writing through the use of ALT, adding credibility to the questionnaire results. Figure 3 illustrates students' active engagement in peer-checking their writing on Miro apps.

Figure 3

An Example of Students' Leaderboard on Quizizz



The students were able to navigate the ALT platform with ease and did not frequently ask for clarification or additional instruction on how to use it, which indicates that they were comfortable and familiar with the platform. Moreover, it could be confirmed through the interactions between students and the ALT system, where they would submit their answers and then receive feedback, correction, scores, and ranking promptly. However, it is essential to remember that the observation may only capture a limited perspective and may not reflect the experiences of all students. Therefore, it is essential to triangulate data from multiple sources in order to increase the study's credibility and reliability.

4.4. Students' Challenges with the Use of ALT

The following part will analyze students' obstacles to implementing ALT in their EFL writing classes. It seeks to identify the main difficulties that the participants faced when using ALT tools and how these challenges may impact their learning outcomes. The items addressed several aspects including technical issues, training and guidance, user interface, limitations of the free version, and the cost of the professional version.

Table 4

Students' Challenges of Using ALT in EFL Writing Course

	Disagree (%)	Neutral (%)	Agree (%)	Min	Max	Mean	Std. Deviation
I experienced technical difficulties when using ALT during class.	-	11.1	88.9	3	5	4.27	.637
I did not receive enough training or guidance on how to use ALT for EFL writing activities effectively.	4.7	36.8	58.5	2	5	3.78	.863
The layout of the user interface was confusing to me.	18.8	81.2	-	2	3	2.81	.394
The free version of ALT is limited in its capabilities, which makes it difficult to use effectively for my EFL writing assignments.	-	3.4	96.6	3	5	4.54	.550
The professional of the ALT provides more features that would help me to improve my EFL writing skills.	-	10.2	89.8	3	5	4.48	.666
I cannot afford the cost of the professional version of ALT	-	6.8	93.2	3	5	4.80	.531

The table above exhibits the results of a 5-point Likert scale survey regarding the obstacles students face when using ALT in EFL writing courses. The majority of students (88.9%) agreed that they did not experience technical difficulties when using ALT in class, and the mean score for this statement was 4.27. However, responses to the statement regarding the lack of training or guidance on how to effectively use ALT were more variable, with 58.5% concurring, 36.8% being neutral, and 4.7% disagreeing; the mean score was 3.78.

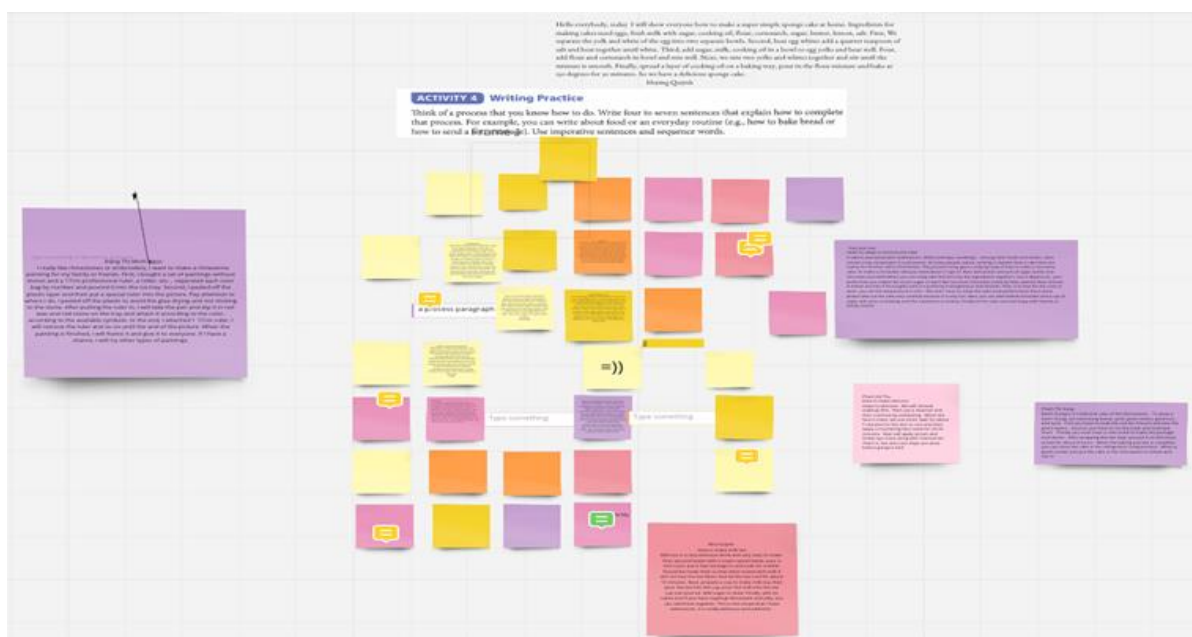
The statement regarding the perplexing user interface received a greater proportion of disagreeing responses (18.8%) and a lower mean score (2.81). The majority of students (96.6%) agreed that it was difficult to use the free version of ALT effectively for their EFL writing

assignments, with a mean score of 4.54.

It is encouraging that the results of the surveys corroborate the observations. Students' reports of encountering technical issues and the lack of training and guiding opportunities when initially utilizing Miro point to a possible need for further training and education on the technical elements of using ALT. This supports the findings in Do et al. (2022) that raise instructional difficulties related to arranging writing space for each student, their doubling writing space, or uncontrollable movement of writing notes.

Figure 4

An Example of Students' Collaboration in a Writing Task on Miro Apps



Miro apps allow users to create and place sticky notes on the board. In some cases, students may unintentionally or mistakenly duplicate their sticky notes, resulting in clutter and confusion. This can make it challenging for both students and instructors to navigate and interpret the information on the board effectively. This corresponds with the instructional difficulties discussed in Do et al. (2022). However, the fact that students enjoyed using Miro and Quizizz's interface shows that they could become invested in the technology with the right amount of guidance and practice.

The statement concerning the affordability of the professional version of ALT received a mean score of 4.80 and a high percentage of agreement (93.2%). This suggests that expense may be a significant barrier for students to access the complete spectrum of features that would assist them in enhancing their EFL writing abilities. While technical issues with ALT may not be a significant concern for students, training, interface design, and cost may hinder their effective use of the tool in their writing classes.

Crosschecked the observation, the data appears to support the findings of the survey regarding the prevalence of Grammarly's free version. As previously mentioned, the free version of Grammarly may not identify the structure of sentences and may suggest perplexing terms. This result aligns with Calma et al. (2022), Ebadi et al. (2022), Nguyen et al. (2021). This data corroborates the survey's findings regarding the number of users of the free version

of Quizizz. According to reports, the free version of Quizizz has fewer available activities and possibly less access to exercise and assignment sources.

5. Conclusion, Implications, Limitations, and Recommendations

5.1. Conclusion

In a nutshell, the majority of EFL writing students viewed ALT as an effective instrument for enhancing their writing abilities, and they would recommend it to other EFL writing students. However, the students encountered obstacles when using the technology, such as a difficult interface, a lack of personalized feedback, and the inability to comprehend how to use ALT effectively. These obstacles could affect the efficacy of ALT in enhancing writing skills, underscoring the significance of confronting them in EFL writing classes. Particularly, students believed ALT provided constructive feedback on their word choice, grammar, and sentence structure, but they were less effusive about the platform's ability to provide examples and explanations. This indicates that students may require additional guidance and support to comprehend how to use ALT to enhance their writing abilities. Additionally, the study discovered that gamification of learning activities, such as the use of Quizizz games, was an effective method for engaging students with ALT. This is consistent with previous research on the application of gamification in education (Lim & Yunus, 2021; Nguyen et al., 2021; Pertiwi, 2020; Wen & Aziz, 2022), which demonstrated that gamification could increase student motivation and engagement. Furthermore, the majority of students did not encounter technical difficulties when utilizing ALT in EFL writing classes, according to the findings of the study. However, many students felt they lacked training or direction on how to use ALT effectively. This emphasizes the significance of providing adequate support and training to pupils so that they can effectively utilize the technology.

5.2. Implications

This study has important implications for both educators and students. As ALT becomes more prevalent in education, it is crucial to comprehend how it can be utilized to enhance student writing abilities. This study found that students viewed technology favorably and believed it helped them enhance their writing. Educators can use these findings to inform their use of adaptive learning technology in the classroom and to develop strategies for enhancing students' writing skills. In addition, this study emphasizes the need for ongoing research into the efficacy of adaptive learning technology in education. On the basis of these findings, future research can provide a deeper comprehension of how adaptive learning technology can be used to improve student learning outcomes.

5.3. Limitations and Recommendations

The study sheds light on several hindrances that impede the seamless utilization of ALT for enhancing writing skills. Firstly, the study's sample size of 116 students could be considered small for drawing generalizable conclusions about students' perceptions of ALT in writing skills. A larger sample size would have increased the study's external validity, allowing for more precise and representative findings. However, the researchers may have had practical limitations such as time, resources, and access to participants, which influenced their sample size selection. Secondly, it specifically highlights challenges like technical issues and the necessity for comprehensive training and support. While the identification of these barriers is valuable, the research falls short in presenting concrete strategies to overcome these challenges.

A more comprehensive exploration of potential solutions could have provided educators and institutions with actionable insights to effectively address these obstacles and ensure the smoother integration of ALT into writing classes. Furthermore, a notable limitation of the study is its reliance on self-reported data collected from students and observation. Self-reported data, while offering valuable insights into participants' perspectives, can also be susceptible to biases, inaccuracies, or subjective interpretations. This could potentially affect the credibility of the findings and introduce an element of uncertainty into the study's conclusions, or limit the depth and breadth of the data collected. Incorporating multiple data sources, such as focus groups, interviews with teachers and administrators or even writing tasks, could have complemented the self-reported and observed data and provided a more diverse and well-rounded understanding of the issues at hand. In addition, the study lacks a comparative analysis of the effectiveness of ALT in comparison to traditional teaching methods or alternative technology solutions. Without such a comparison, it becomes challenging to discern whether the improvements observed in students' writing skills are solely attributed to the use of ALT or could be influenced by other factors. A comparative approach could have provided a clearer picture of how ALT fares against existing pedagogical methods, contributing to a more nuanced interpretation of the study's outcomes. Lastly, the study's short duration may have limited the extent to which students' perceptions of adaptive learning technology in writing skills were fully understood. The researchers conducted the study over a period of eight weeks, which might not be enough time for students to fully engage with the adaptive learning technology and develop their perceptions. A more extended research period might have captured a wider range of experiences, attitudes, and behaviors regarding the use of ALT in writing skills.

In summary, while the study offers valuable insights into the obstacles related to ALT's implementation and its impact on students' perceptions, the humble size of the population, the absence of specific solutions to challenges, potential biases in self-reported data, the lack of comparative analysis warrant careful consideration, and the research's short duration. Addressing these limitations could enhance the study's overall robustness and the applicability of its findings to both academic and practical contexts. These recommendations can help to provide a more nuanced understanding of the role of adaptive learning technology in language learning and inform the development of more effective pedagogical practices.

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ÁP DỤNG CÔNG NGHỆ HỌC TẬP THÍCH ỨNG TRONG CÁC LỚP HỌC VIẾT BẬC ĐẠI HỌC: QUAN ĐIỂM CỦA SINH VIÊN

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Tóm tắt: Nghiên cứu này tìm hiểu quan điểm của sinh viên về việc áp dụng Công nghệ học tập thích ứng (ALT) trong các lớp học viết bậc đại học. ALT ứng dụng trong nghiên cứu bao gồm Đánh giá viết tự động (AWE) với Grammarly, Ứng dụng nội dung thích ứng (ACA) với Quizizz, và Nền tảng viết kỹ thuật số (DWP) với Google Docs và Miro. Dựa trên khung lý thuyết phân loại tư duy Bloom, nghiên cứu sử dụng phương pháp hỗn hợp này kết hợp sử dụng bảng câu hỏi được điều chỉnh từ Nguyễn Thị Hồng Nhung và Nguyễn Thị Thúy Huệ (2022), Gohar và El-Ghool (2016); và quan sát lớp học để thu thập dữ liệu định lượng và định tính, chú trọng vào thái độ chung của sinh viên với ALT, nhận thức về tiện ích của ALT, sự hài lòng với việc triển khai ALT, và những khó khăn sinh viên gặp phải. Kết quả cho thấy sinh viên nhìn chung có thái độ tích cực với ALT, đặc biệt là khả năng cung cấp phản hồi được cá nhân hoá, và hỗ trợ cho các yêu cầu học tập cụ thể. Tuy nhiên, những trở ngại như khó khăn về kỹ thuật, và nhu cầu đào tạo và hỗ trợ cho cả sinh viên và giảng viên cần phải được giải quyết. Nghiên cứu cũng đề xuất một số khuyến nghị cho việc triển khai ALT trong các lớp học viết.

Từ khóa: Công nghệ học tập thích ứng (ALT), quan điểm của sinh viên, phân loại tư duy Bloom, lớp học viết, giáo dục đại học