

Mobile Assisted Language Learning as a Formative Assessment Method to Enhance the English Competence of EFL Learners to the CEFR B1 Level

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Article information	Abstract
<p>Article history: Received: 13 Mar 2024 Accepted: 18 Apr 2025 Available online: 22 Apr 2025</p> <p>Keywords: English English competencies MALL Formative assessment CEFR</p>	<p><i>This research endeavors to assess the efficacy of Mobile Assisted Language Learning (MALL) in elevating students' English proficiency to the Common European Framework of Reference (CEFR) B1 level. The study involves identifying the most suitable mobile application for formative assessment, implementing it to enhance students' English competency, and investigating their attitudes toward MALL in formative assessment. Engaging four specialists, a thorough evaluation was conducted to determine the most effective mobile application, revealing Quizziz as the optimal choice for formative assessment. The study involved a purposively selected sample group comprising 139 undergraduate students from a private university, in Thailand, enrolled in the English at Work Course. This sample group underwent pre-tests, post-tests, and self-evaluation using the CEFR B1 abilities checklist and provided feedback through questionnaires and in-depth interviews to gauge their perception. Data analysis involved various statistical methods, including t-test dependent, one-way ANOVA, repeated measures ANOVA, mean, and standard deviation. Results indicated a statistically significant improvement in post-test scores compared to pre-test levels, with the fourth assessment revealing the highest mean score ($\bar{x} = 9.11$, $SD = 3.12$). Notably, the mean scores for each competency descriptor at the CEFR B1 Level demonstrated considerable variation ($F = 21.717$, $p < .001$), indicating enhanced performance across competencies. According to the questionnaires, student perception was significantly high ($\bar{x} = 4.64$, $SD = 0.47$), affirming MALL's effectiveness as a formative assessment tool. The corresponding in-depth interview data further underscored students' positive feedback and favorable attitudes toward MALL. Therefore, this research not only contributes to the understanding of the effectiveness of MALL in enhancing English proficiency but also sheds light on the practical implications of integrating technology-driven formative assessment methods into language education. This study provides valuable insights for educators seeking to create engaging and effective language learning environments by elucidating the positive student attitudes and perceptions toward MALL.</i></p>

INTRODUCTION

In the context of a rapidly globalizing world, proficiency in the English language has become a valuable skill, opening doors to academic excellence and global career opportunities. This heightened significance places increased pressure on educational institutions to assess and elevate students' English proficiency to meet the standards of higher education and the CEFR. Concurrently, the digital era has resulted in transformative changes, with technological advancements playing a critical role in reshaping the educational approach. Against this backdrop, the integration of technology, particularly through mobile applications, has emerged as a promising solution to address the evolving needs of English language learners. The integration of technology in English language learning aligns with both the Office of the Higher Education Commission (OHEC, 2016) and the Ministry of Higher Education, Science, Research and Innovation (MHESI, 2022) directives. While the 2016 policy emphasized the use of "can-do descriptors" for formative assessment to evaluate students' abilities, the 2022 directive builds on this by further promoting continuous formative assessment, incorporating technology, and enhancing English proficiency through mobile applications. Both documents reinforce the importance of ongoing, detailed assessments to track students' language progress effectively. Within the dynamic educational environment of Thailand, where 52 million people accessed the internet in 2019, and mobile device usage is ubiquitous, understanding the interplay of globalization, technological advancements, and national educational goals becomes crucial.

In the ever-evolving landscape of language education, the inquiry into the ideal formative assessment tool is intricately linked with the widespread influence of technology on the learning approach. When integrated with technology, they offer more dynamic, interactive, and personalized learning experiences than traditional methods. Digital tools, particularly mobile applications, adapt in real-time by providing immediate feedback, personalized insights, and an engaging interface that aligns with contemporary learners' technological habits. By leveraging the features of mobile applications, formative assessments can move beyond mere testing and become tools for continuous learning and self-improvement, enabling learners to practice at their own pace, revisit challenging content, and monitor their progress efficiently.

In this context, this study explores how MALL through applications like Quizziz can be leveraged to design formative assessments that improve students' learning engagement and proficiency outcomes to achieve CEFR B1 level competency. By merging assessment with interactive technology, this research aims to highlight how formative assessment tools can evolve to meet the diverse and individual students' needs in the digital era.

A glimpse into Thailand's internet usage trends reveals a staggering million individuals accessing the internet in 2024. According to Datareportal (2024), recent data indicates that 63.21 million individuals in Thailand accessed the Internet, representing 88.0% of the total population. Additionally, 97.81 million cellular mobile connections were active in Thailand in early 2024, equivalent to 136.1 percent of the total population. Furthermore, mobile consumers aged 18 to 24 account for around 48.7 percent of all users, with university students being the vast majority (Kemp, 2023). This demographic shift highlights the undeniable significance of mobile

devices as essential tools for online learners, making mobile applications for teaching strategies more beneficial and crucial.

Against this backdrop, the exploration of what currently constitutes the ideal formative assessment tool becomes a pivotal undertaking, intertwining the technological landscape with the pedagogical sphere to enhance the effectiveness of language education. Thus, the ideal formative assessment in today's context harnesses the power of technology to support personalized, engaging, and efficient learning pathways that can ultimately drive better student outcomes. Specifically, tools like MALL applications provide real-time feedback, adapt to individual learning paces, and foster increased motivation through gamified elements. This research supports the notion that integrating technology into formative assessment both enhances student engagement and improves proficiency levels. By focusing on these innovative assessment strategies, we can better prepare students for their successful English language learning.

The key issues that led the researcher to conduct this study include the growing need to improve English proficiency among EFL learners to meet CEFR standards, particularly at the B1 level, and the increasing role of technology in education. Despite the widespread use of MALL in various language learning areas, its application as a formative assessment tool remains underutilized. Additionally, there is a lack of clarity on which mobile application is most effective for formative assessment in EFL contexts, prompting the researcher to explore how it can enhance English competence and align with educational goals.

Several studies have supported the advantages of mobile applications for education. According to Heyoung and Yeon-Hee (2012), mobile applications are frequently used in English language teaching to practice grammar, listening, speaking, reading, and writing. This increased grasp of grammar also led to an improvement in English proficiency. Moreover, MALL has been utilized to enhance other abilities such as teamwork, collaboration, listening, reading, and memorization of English vocabulary (Suwantarathip & Orawiwatnakul, 2015) and boost English competency (Hashim et al., 2017). In addition, it has been successfully used in formative assessment throughout various academic disciplines. However, applying MALL in formative assessment for authentic assessments has yet to be explored.

Research questions

The research was carried out to address the following research questions:

1. Which application is most appropriate for formative assessment?
2. Can it be utilized as a formative assessment to enhance the English competence of EFL learners to the CEFR B1 level?
3. What are students' perspectives regarding the use of MALL in formative assessment?

THEORIES AND RELATED LITERATURE

This study draws upon two key theoretical frameworks: MALL, which provides crucial insights into how learners engage with it, and formative assessment tools. Constructivism, rooted in the work of Jean Piaget (1954), asserts that learners construct knowledge through active engagement with their environment. In language learning, this theory emphasizes the importance of interaction, reflection, and continuous assessment, which align with the goals of formative assessment. Formative assessment encourages learners to actively participate in evaluating their progress, fostering a deeper understanding of the material as they integrate new information into their existing knowledge base. This constructivist approach is particularly relevant to MALL, where students can use mobile applications to assess their performance in real-time and adjust their learning strategies accordingly (Vygotsky, 1978).

According to Constructivism, the TAM, developed by Davis (1989), complements this framework by offering a perspective on how learners adopt and utilize technology. It posits that two factors — perceived usefulness and perceived ease of use—determine users' acceptance of new technology. In the context of this research, this theory is applied to understand how students perceive MALL tools, such as Quizziz, Kahoot, and Quizlet, as effective platforms for formative assessment in language learning. For learners, such tools must be both easy to use and beneficial to boost language proficiency.

Constructivism and TAM provide a thorough, comprehensive theoretical foundation for this study. Constructivism informs the pedagogical approach of using formative assessment in language learning, while TAM addresses the technological considerations, ensuring that MALL tools are both educationally effective and user-friendly. This dual framework integrates technology into language education, particularly in fostering self-directed learning and student engagement.

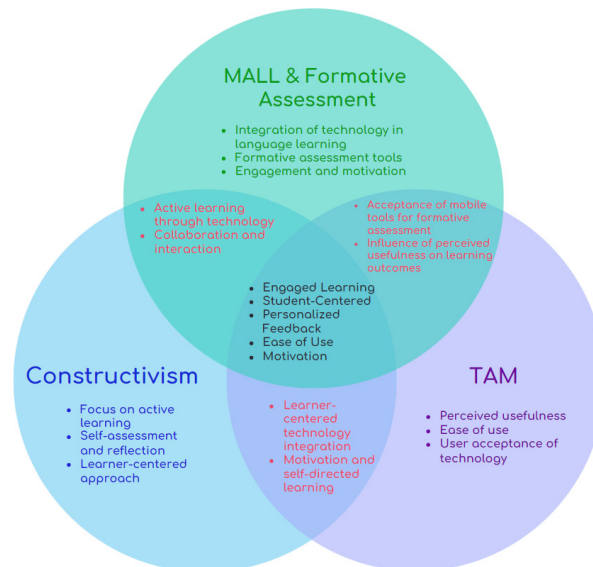


Figure 1 Related theories

Formative assessment

Formative assessment was described as a process for taking into account, collecting evidence, and evaluating factors to identify and comprehend variations between pre- and post-performance in each area of the overall evaluation (Liukongsathaporn, 2017; Sanrattana, 2017). Formative assessment, according to Bennett (2011), could be a method for enhancing performance. Whereas Alvarez et al. (2014) described the formative assessment as a knowledge and understanding observation procedure to provide feedback and various instructions to maximize the learning outcome.

According to Shore et al. (2013), the appropriate formative assessment should be included in the teaching process with transparency, and validity, as well as the information needed for teaching and learning. Using the method, the assessment's goal must be established. Both learning and assessment must involve learners. Feedback must be delivered clearly and concisely. An effective formative assessment is similar to a learner portfolio that inspires new teaching strategies and improves student learning. While several studies underline the importance of formative assessment for improving student outcomes, there is limited exploration of how these assessments can be optimized through modern technology, a critical gap that this study seeks to address.

Mobile Assisted Language Learning (MALL)

Self-regulated learning is crucial for formative assessment since it helps to strengthen students' autonomy (William, 2014). Through formative assessment, students can acquire information and a clear objective that will assist them in accomplishing their goals. MALL is an application of smartphone and tablet technology assisting language learning (Palakawong, 2015). According to several studies, it is an effective method for boosting English proficiency, as shown by Klopfer et al. (2002). MALL is a portable tool that can increase engagement and learning. Baleghizadeh and Oladrostam (2011) found that MALL-using students improved more in grammar proficiency than the other group. Additionally, Suwantarathip and Orawiwatnakul (2015) found that it could raise students' motivation and vocabulary performance. To the satisfaction of students and teachers, MALL can also be utilized as a tool for lesson reviews (Worapitbenja et al., 2015). Besides that, the data can be modified for circumstance and timing. With this technology, knowledge sharing and self-directed learning are both available.

Quizizz is well-known as an educational learning platform that provides activity tools to make a classroom more engaging with various features to create and administer quizzes and other types of assessments. Because of its engaging, interactive, dynamic platform, individualized feedback, self-assessment and progress tracking, and customizable content, this application can be a beneficial instrument in teaching English. Through the Quizizz website, educators can create lessons, conduct a formative assessment, assign homework, and engage in other fascinating activities. Additionally, this platform provides instructors with more options to post the lesson, quizzes, reports, sharing options, and other features that enable teachers and students to participate in educational activities. Another crucial strategy for helping learners in this digital age is "Bring Your Own Device" (BYOD). On their own devices, students can access

the classes or quizzes through their paths. The competitive and self-learning features boost students' capacity to interact with the lessons independently. Quizizz has been regularly utilized as an interactive assessment tool during the epidemic era (Haripriya, 2023).

Numerous studies and projects on various topics have acknowledged Quizizz as a powerful instructional tool. Students responded well with positive remarks about how this digital learning app boosted their interest and provided beneficial quick feedback in science lessons, according to Darmawan et al. (2020). Additionally, Callista et al. (2021) discovered that Quizizz could increase students' interest in studying irregular verbs after learning them in class as well as their post-test performance. Quizizz was implemented by Degirmenci (2021), Penhataikul (2022) and Suwanto (2021) into the reading course during tutorial and assessment as a tool to enhance reading comprehension. The outcome indicated positive results for learners in both students' improvement in reading and attitudes which were favorable and successful accordingly. This is consistent with what Yunus et al. (2021) discovered, which revealed that this application was frequently utilized in research and received praise for its efficiency, viability, accessibility, and motivational qualities for students. This also aligns with Pham's (2023) use of Quizizz to evaluate the grammar of English majors. The study's findings revealed that the group using Quizizz for practice and a quiz each week received considerably higher post-test results than the group using paper for a 10-week period. In conclusion, Quizizz has gained much positive feedback, especially for its fast and customized platform that increases students' performance and particularly motivation.

In addition to Quizizz, other popular MALL tools include Quizlet and Kahoot. Quizlet supports vocabulary learning through flashcards and games and has been shown to enhance learner engagement, especially among low-proficiency students (Dizon, 2016; Sanosi, 2018). While Kahoot offers competitive real-time quizzes that increase motivation, some studies noted drawbacks such as time pressure and connectivity issues (Wang & Tahir, 2020). These tools were initially reviewed and compared based on pedagogical and technological criteria (see Appendix A). However, after expert consultation, Quizizz was selected as the most appropriate tool for formative assessment in this study due to its ability to provide immediate feedback, track progress, and foster student engagement, all of which are essential for the ongoing evaluation of learning in formative assessment.

RESEARCH METHODOLOGY

A mixed-methods approach was employed in this investigation, integrating both qualitative and quantitative methods. Data for the pre-and post-tests and the students' self-checklists of their CEFR B1 Level competency were gathered using a quantitative method before and after the students completed the formative assessments using the chosen MALL. The focus on CEFR B1 was intentional, as it aligns with the learning outcomes of the English at Work course, which is designed based on CEFR B1 content. The choice of CEFR B1 ensures that the study addresses an intermediate proficiency level relevant to practical, workplace-related English. Meanwhile, the qualitative method was used to examine the in-depth interview data.

Sample group

After receiving an exemption from the Ethics Review Committee (Certificate NO.: RSU-ERB2020/174), all participants—139 students, the total number enrolled in the English at Work Course—were asked to sign a consent document to participate in this research. This ensured that the participants understood their rights, including the right to withdraw from the study at any time, and measures were taken to maintain confidentiality and data protection throughout the research process. Purposive sampling was employed to intentionally select students from various proficiency levels (low, moderate, and high), allowing for a more representative distribution of abilities. This method was chosen over random sampling to ensure the inclusion of diverse proficiency levels, which was essential for analyzing the effectiveness of formative assessment across different learner profiles. By focusing on the students in the English at Work Course, we maintained consistency in instructional content, teaching methods, and assessment criteria, which is crucial for evaluating the impact of formative assessments in language learning.

The pre-test, served as a diagnostic tool to assess the students' initial English proficiency rather than as a formal placement test. Based on their pre-test scores, the students were grouped into three proficiency categories: low (less than 50%), moderate (50-80%), and high (80-100%). This grouping enabled a targeted analysis of how formative assessments impacted students at varying levels of competency.

Research instruments

The in-depth interview questions for choosing the most appropriate MALL for formative assessment

Since MALL integrates principles from language acquisition, educational technology, and assessment, it serves as an effective framework for exploring the use of mobile applications to enhance formative assessment practices and support students in achieving target language proficiency levels. Five open-ended questions were directed toward four specialists representing diverse disciplines: assessment and evaluation, instructional technology, and language acquisition teaching English as a foreign language, and an English teacher of English at Work Course. These specialists were consulted to provide insights and expertise on the suitability of three mobile applications -- Quizziz, Kahoot, and Quizlet -- for formative assessment in language learning. These three applications were selected for this research due to their widespread use in educational contexts, particularly for formative assessment in language acquisition. Multiple reputable sources have consistently ranked these applications among the top tools for education. For example, the Center for Learning and Performance Technologies (Hart, 2023) featured them in its *Top 100 Tools for Learning 2022* report. Higgin and Kasey Bell (2021) recognized them as leading formative assessment tools. As illustrated in Figure 2, their capacity to facilitate interactive, game-based learning makes them ideally suited for the objectives of this study -- to improve English competence using MALL.




Compare the tools			
	 Quizizz Best overall	 Quizlet Best for flashcards and test prep	 Kahoot! Best choice for game shows
	Get it now	Get it now	Get it now
Grades	3-12	7-12	1-12
Price	Free, Paid	Free to try	Free, Paid
Privacy	78% Warning	61% Warning	80% Pass
Platforms	Web, Android, iPad, iPhone, iPod Touch, Mac	Web	Web, Android, iPad, iPhone, iPod, iPod Touch, Windows, Mac
Pros	Answer explainers, audio/video responses, and asynchronous assignments. Useful reports.	Works well for personal study sessions or game show-style competition.	Oh-so-easy way to make assessment engaging. Ever evolving with new stuff.
Cons	The special stuff is limited to school/district plans. Challenging to sift through the content library.	User-generated content isn't always reliable or appropriate. Not as fun or flashy as competitors.	Tracking individual progress is tedious. User-created quizzes can be poor quality or inappropriate.
Bottom Line	More than a quiz tool: With Quizizz you can create interactive learning experiences, but you'll need a school subscription.	This is a quality study tool that helps students learn and memorize facts, especially with a paid subscription.	This is an effortlessly fun tool, but it shines best with creative implementation that tests its boundaries.

Figure 2 Comparison of mobile application tools

The inquiries in the in-depth interview questions concerned with the particular or distinctive characteristics of each application, their strengths and limitations, the appropriateness of each application for use with formative assessment, the most appropriate tool to be utilized in formative assessment, and suggestions.

CEFR English Proficiency Self-Checklist adapted from CEFR B1 grid assessment

The CEFR English Proficiency Self-Checklist was applied to students' pre-study to identify their English proficiency before participating in the research and identify the later acquired. The checklist comprised eleven key competencies, reflecting essential language skills at the B1 descriptors. These competencies include the ability to understand clear speech, follow radio or TV programs on familiar topics, comprehend every day or job-related texts, and understand personal descriptions. Additionally, the checklist assessed the ability to handle common travel situations, participate in conversations on familiar subjects, describe personal experiences, and narrate stories or events. In writing, it covered the ability to produce simple connected text and personal letters related to experiences and impressions. The inclusion of these specific competencies ensured a comprehensive and balanced assessment of students' language proficiency development through the study.

The pre-test and post-test

The pre-test and post-test were constructed by the researchers and consisted of 15 multiple-choice questions based on the learning outcomes of the English at Work course, which aligns with B1-level content. The development process involved content mapping, where key topics representative of this proficiency level were matched with the course content to verify the test accurately reflected the language skills taught. To ensure content validity, the Index of Item Objective Congruence (IOC) was employed. Three experienced English instructors teaching the course reviewed the test items to confirm their alignment with both the target proficiency level and the course objectives.

Formative assessment tests

Four formative assessment tests each consisting of 15 questions were designed focused on language accuracy and grammar. To effectively boost students' English proficiency to CEFR B1 level, all questions were developed through the content mapping process between the English at Work Course content and CEFR B1 Can-do Descriptors, identifying relevant language functions and grammar points. To fully leverage the capabilities of the MALL tool, Quizizz, the assessments were constructed in four distinct interactive formats: multiple choice, drag-and-drop, sentence unscrambling, and fill-in-the-blank. The multiple-choice questions assessed students' comprehension of key ideas in clear, standard speech and familiar written texts, incorporating real-life contexts such as workplace communication and radio programs. The drag-and-drop and sentence unscrambling formats targeted learners' abilities to engage in conversations, connect ideas with appropriate linking devices, and describe personal experiences. Fill-in-the-blank items were used to evaluate grammatical accuracy in written and spoken communication. Before implementation, all test items were reviewed by three experts and validated using IOC as illustrated in Figure 3.

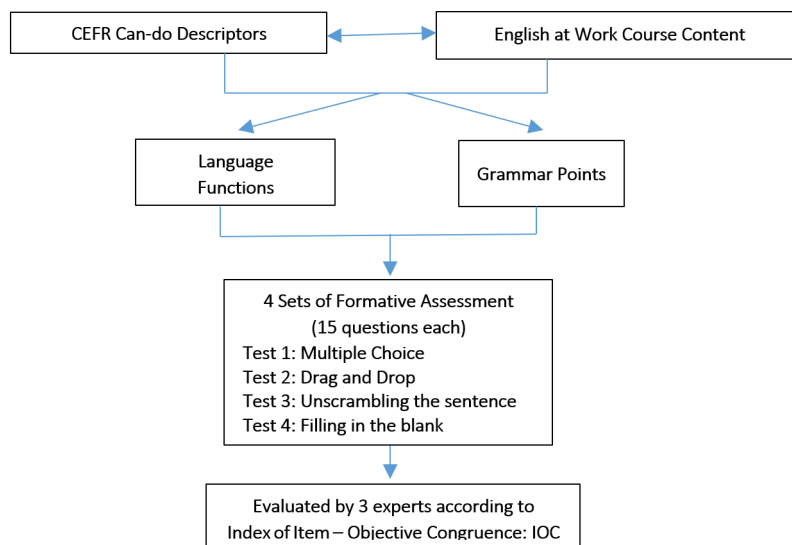


Figure 3 Formative assessment test design process

The questionnaire and the in-depth interview questions for students' attitudes toward MALL

The questionnaire and the in-depth interview were carefully aligned with the research objectives. The questionnaire comprised of three sections focused on capturing the students' attitudes toward formative assessment, knowledge gained, and MALL usage. The in-depth interview consisted of open-ended questions exploring the students' perceptions divided into 4 aspects: their experiences using formative assessment; their attitudes toward it as a formative assessment tool; their opinions on using Quizziz in an English testing; and the benefits they gained from participating in this research. The development of both the instruments was informed by two key theoretical frameworks: Constructivism (Piaget) and TAM. Constructivism emphasizes active learning, which complements the role of formative assessment in encouraging reflection and deeper understanding. TAM, in contrast, focuses user interaction with technology, particularly perceptions in adoption and effectiveness of MALL tools in learning environment usefulness and ease of use.

RESEARCH PROCEDURE

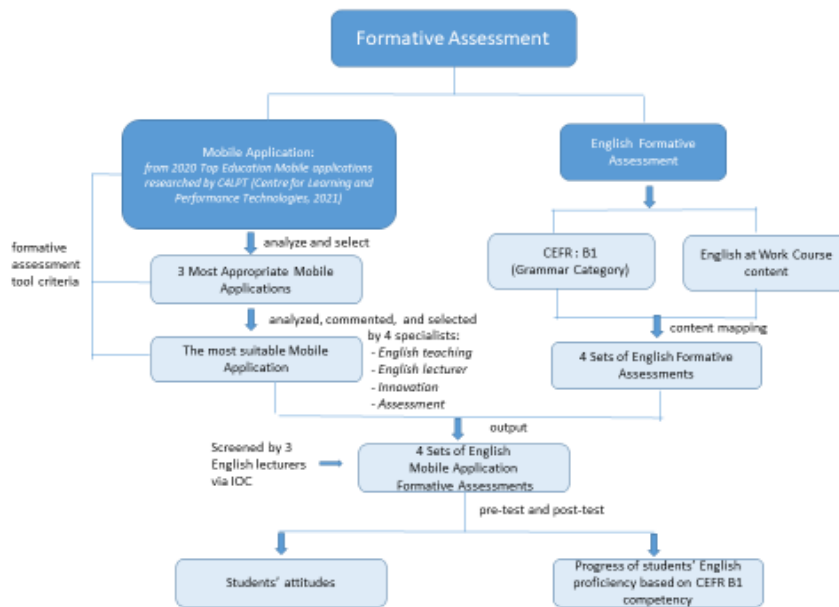


Figure 4 Conceptual framework

Data collection

All participants, 139 undergraduate students, were required to take a pre-test of 15 multiple-choice questions and a student's self-checklist of the CEFR B1 abilities covering 11 competencies to establish their level of English proficiency via a Google Form. The pre-test results were divided into three groups: high, moderate, and low, making it evident which group of students could benefit the most from using MALL as a formative assessment. During the course, they had to complete four formative assessments: two for the midterm and the others for the final, through

the mobile application tool, Quizziz. Every two weeks, students took a 15-minute formative assessment test in class that consisted of 15 questions from the English at Work courses, to B1-level competency. After finishing the four formative tests, the students were instructed to take the post-test and repeat their self-assessed CEFR B1 competency checklist to identify the level of English proficiency they had attained. This method aimed to monitor the students' improvement in their English abilities. To figure out how the students experienced using this application for formative assessment, a questionnaire on user attitudes toward the application was distributed. Questions regarding the attitudes of the students toward MALL, formative assessment, knowledge acquired, and the use of MALL as a formative assessment tool were then inquired about during the in-depth interview. Following the experimental phase, the results of the post-test, the questionnaire, and the in-depth interview about the student's attitudes, along with the CEFR B1 skills checklist, as well as their self-assessments of those competencies, were analyzed.

Data analysis

The data collected was evaluated to identify the student's English competency inferred from the CEFR B1 level after completing the formative assessment via MALL (Quizziz). To assess the significance between students' pre-test and post-test results, a simple t-test was used. In addition, descriptive statistics (mean and standard deviation) were generated on the participants' responses to their questionnaire to investigate their attitudes toward using it for the formative assessment. Meanwhile, the results from the in-depth interviews were analyzed using descriptive analysis.

RESULTS AND DISCUSSION

The findings and conclusions are presented in a certain order to address the research questions. The first research question is: Which application is most appropriate for formative assessment?

The result of the most appropriate mobile applications for formative assessment: Quizziz

Based on the findings from four specialists' reviews: assessment and evaluation, instructional technology, teaching English as a foreign language, and an English teacher of English at Work Course, these specialists were interviewed to gain insight and knowledge about the applicability of three mobile applications for formative assessment in language learning. The questions focused on the unique qualities of each application, along with its advantages and disadvantages. They also asked whether each application was appropriate for formative assessment, which tool would operate best, and if there were any recommendations. The results are shown in Appendix A.


It can be concluded that Quizziz was chosen to be the most appropriate one. Most of the participants agreed that, in comparison to Kahoot and Quizlet, Quizziz is more diverse and engaging, as well as offering a greater range of question types, such as multiple-choice, fill-in-the-blank, true/false, and open-ended questions, whereas Quizlet primarily focuses on flashcards

and study sets. Quizziz also lets students move at their own pace individually, which is beneficial for self-study and personalized learning, without the need for synchronized live sessions. On the other hand, Kahoot focuses more on live, real-time multiplayer quizzes. The application gives students rapid feedback on their performance, enabling them to learn from their errors and develop over time. Kahoot and Quizlet may not offer immediate feedback, depending on the quiz format or study mode being used. It also offers more customization options, such as the ability to include photographs, GIFs, and other multimedia elements in questions, which enhances the learning experience and helps maintain student engagement. Moreover, the application is made to smoothly interact with a variety of learning management systems (LMS), including Microsoft Teams and Google Classroom. This makes it simpler for teachers to add questions to their previously prepared lesson plans and distribute them to students. Quizlet and Kahoot both provide integration options. Both have integration options, yet many educators prefer Quizziz due to its smooth connection. Furthermore, one expert appreciated this application because it allowed each user to regulate the music system, which greatly excited several students.

The second research question is: Can it be utilized as a formative assessment to enhance the English competence of the EFL learners to the CEFR B1 level? The result was presented in the pre-test, the post-test, four sets of formative assessment scores, and the students' self-checklists of their CEFR B1 Level proficiency before and after completing the formative assessments via the selected MALL– Quizziz. This application is considered as an effective tool for formative assessment by allowing instructors to monitor student learning in real-time through quizzes with prompt feedback. This ongoing assessment promotes active student reflection, identifies learning gaps, and guides instructional improvement. The detailed report of the platform provides insight into both individual and class performance, supporting data-driven teaching. In addition to assessment, it was used for various learning purposes, catering to diverse learning preferences engagingly. These included self-paced practice sessions, which enabled learners to review the content at their own pace; collaborative activities that enhanced peer learning; and interactive competitions that boosted motivation through gamification.

Table 1 reveals that the student's English proficiency significantly improved after completing the MALL formative assessment. where, at $t = 9.387$, the mean post-test total score is 9.49 with a standard deviation of 2.89, which is significantly higher than the mean pre-test total score of 7.39 with a standard deviation of 3.01, indicating that MALL -- Quizziz has a significant influence and has a significant impact on the student's English proficiency to the CEFR B1 Level.

Table 1
The result of the pre-test and post-test scores

Scores (15 points)	N	\bar{x}	SD	t	p-value	Summary	<div>Before and after completing MALL</div> 
Before completing MALL	139	7.39	3.01	9.387	< .001	after > before	
After completing MALL	139	9.49	2.89				

To further illustrate and figure out the group of students that the formative assessment via Quizizz can upgrade their English with, the students were classified into 3 groups according to their pre-test score: the low: 73 students (under 50%), the moderate: 51 students (between 50 and 80%), and the high: 15 students (above 80%). As shown in Table 2 and Figure 4, it revealed that the low and the moderate scored significantly higher compared to the pretest (the low: $t = 9.734$, $p < .001$; the moderate: $t = 3.892$, $p < .001$). However, the high showed similar results between the pre-test and the post-tests ($t = 0.695$, $p = .499$).

Table 2
The categorized group results

<i>Group</i>	<i>Scores</i>	\bar{x}	<i>SD</i>	<i>t</i>	<i>p-value</i>	<i>Summary</i>
<i>The Low</i> (<i>n</i> = 73)	Pre-test	5.08	1.61	9.734	< .001	Post > Pre
	Post-test	8.05	2.42			
<i>The Moderate</i> (<i>n</i> = 51)	Pre-test	9.24	1.07	3.892	< .001	Post > Pre
	Post-test	10.57	2.43			
<i>The High</i> (<i>n</i> = 15)	Pre-test	12.80	0.94	0.695	0.499	-
	Post-test	13.07	1.67			

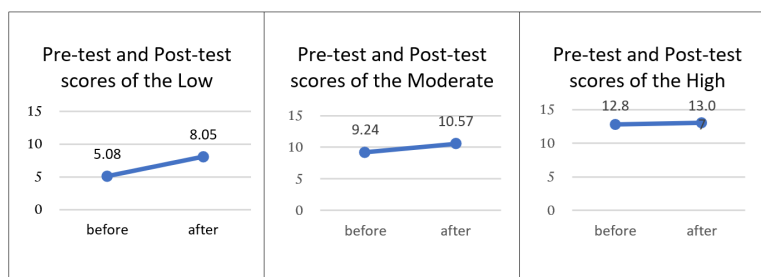


Figure 4 Comparison of the categorized group

The pre-test, each formative assessment, and the post-test average scores were analyzed and compared to provide information on the development of English proficiency, as shown in Table 3, in order to further clarify and explain the outcome. The data reveals that the selected mobile application, Quizizz, could be beneficial as a means to enhance each group's students' B1 English proficiency. In addition, the average results from Formative Assessments 1–4 have been steadily improving. It indicates that in Formatives 3 and 4 when the results were comparable to those of the high-score group, the moderate-score group received higher scores, almost the same as the high. This demonstrates that students' ongoing efforts to improve their English have been continuous. Additionally, when considering the low group score, it indicates that the score increases respectively and significantly in every formative assessment, rising from 5.08 (33%) to 8.05 (53%) continuously, which means after completing the formative assessment via MALL: Quizizz, they shift themselves from the low score group to the moderate one. This assures that students' English proficiency, especially the low ones can be raised to CEFR B1 Level by using it.

Table 3

Comparison of formative assessments and the post-test average scores of each categorized group

Group	Pre-test		Formative		Formative		Formative		Formative		Post-test	
			Assessment 1		Assessment 2		Assessment 3		Assessment 4			
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Low scores (N = 73)	5.08	1.61	6.54	2.49	7.25	2.39	7.99	2.72	8.29	2.89	8.05	2.42
Moderate scores (N = 51)	9.24	2.07	8.35	2.85	8.92	3.12	9.45	3.34	9.82	3.06	10.57	2.43
High scores (N = 15)	12.8	0.94	9.80	3.38	9.93	3.61	9.53	3.44	10.8	3.36	13.07	1.67

To overview the progress of the student's English proficiency on CEFR B1 Level after completing each formative assessment via MALL: Quizizz, the results of the 1st, 2nd, 3rd, and 4th formative assessments were analyzed as shown in Table 4. It was discovered that the mean scores of each varied significantly ($F = 21.717$, $p < .001$), with the highest mean score from the fourth assessment ($\bar{x} = 9.11$, $SD = 3.12$), followed by the third assessment ($\bar{x} = 8.68$, $SD = 3.10$), the second assessment ($\bar{x} = 8.13$, $SD = 2.96$) and the first assessment ($\bar{x} = 7.54$, $SD = 2.94$), respectively. It confirms that the use of the selected mobile application, Quizizz, can help students achieve higher B1 language proficiency.

Table 4

1st - 4th Formative assessment

Formative assessment	Total score	\bar{x}	SD	F	p-value	Summary
1 st	15	7.54	2.94	21.717	< .001	4>3>2>1
2 nd	15	8.13	2.96			
3 rd	15	8.68	3.10			
4 th	15	9.11	3.12			

To determine the students' progression in CEFR proficiency to B1 level, the final stage in achieving the second objective, a comparison of the student's language proficiency at the B1 level before and after using Mall—Quizizz was conducted as shown in Table 5 and Figure 5. It was found that before completing the formative assessments via Quizizz the top 3 competencies that the students had were Competency 1, the ability to understand points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc., with the highest number of 80 people, representing 70.8 percent, followed by Competency 2, the ability to understand the main point of many radio or TV programs on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear, with 64 people, representing 56.6 percent. and Competency 10, the ability to write simple connected text on topics that are familiar or of personal interest, 62 people, representing 54.9 percent, respectively. The three lowest rankings were: Competency 5, the ability to deal with most situations likely to arise whilst travelling in an area where the language is spoken; and Competency 6, the ability to enter unprepared into conversation on topics that are familiar, of personal interest, or pertinent to everyday life (e.g., family, hobbies, work, travel, and current events), 42 people, representing 37.2 percent; followed by Competency 11, the ability to write personal letters

describing experiences and impressions, 35 people, representing 31.0 percent; and Competency 9, the ability to narrate a story or relate the plot of a book or film and describe my reactions, 33 people, representing 29.2 percent. The results of the data analysis indicated that the skills in Competencies 5, 6, 11, and 9 were in the least order. It is an issue that should be considered when comparing skills acquired through mobile applications.

According to the students' self-checklist of their B1 language proficiency after using Mall: Quizizz, the result showed that the student's skills in all competencies increased significantly compared to before the study by considering the percentage of each competency. And when considering further the areas in which students have competency before studying in the lowest three: Competency 5, the ability to deal with most situations likely to arise while travelling in an area where the language is spoken; and Competency 6, the ability to enter unprepared into conversation on topics that are familiar, of personal interest, or pertinent to everyday life (e.g., family, hobbies, work, travel, and current events), which have the same number. The student's skills clearly increased from 37.2 percent to 62.8 percent. Additionally, the student's skills in Competency 11, the ability to write personal letters describing experiences and impressions, increased dramatically from 31.0 to 61.1 percent. Moreover, the ability to narrate a story, relate the plot of a book or film, and describe my reactions Competency 9: Students' skills have increased from 29.2 to 55.8 percent. It reveals that using formative assessment via the selected mobile application, Quizizz can boost the student's English proficiency to B1 level.

Table 5

The students' self-checklists of their CEFR B1 level proficiency before and after completing the formative assessments via the selected MALL-Quizizz

Competency B1	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
1. I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc.	80	70.8	97	85.8
2. I can understand the main point of many radio or TV programs on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.	64	56.6	88	77.9
3. I can understand texts that consist mainly of high frequency every day or job-related language.	52	46.0	75	66.4
4. I can understand the description of events, feelings, and wishes in personal matters.	54	47.8	84	74.3
5. I can deal with most situations likely to arise whilst travelling in an area where the language is spoken.	42	37.2	71	62.8
6. I can enter unprepared into conversation on topics that are familiar, of personal interest, or pertinent to everyday life (e.g., family, hobbies, work, travel, and current events).	42	37.2	71	62.8
7. I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes, and ambitions.	46	40.7	75	66.4
8. I can briefly give reasons and explanations for opinions and plans.	49	43.4	77	68.1
9. I can narrate a story or relate the plot of a book or film and describe my reactions.	33	29.2	63	55.8

Competency B1	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
10. I can write simple connected text on topics that are familiar or of personal interest.	62	54.9	85	75.2
11. I can write personal letters describing experiences and impressions.	35	31.0	69	61.1

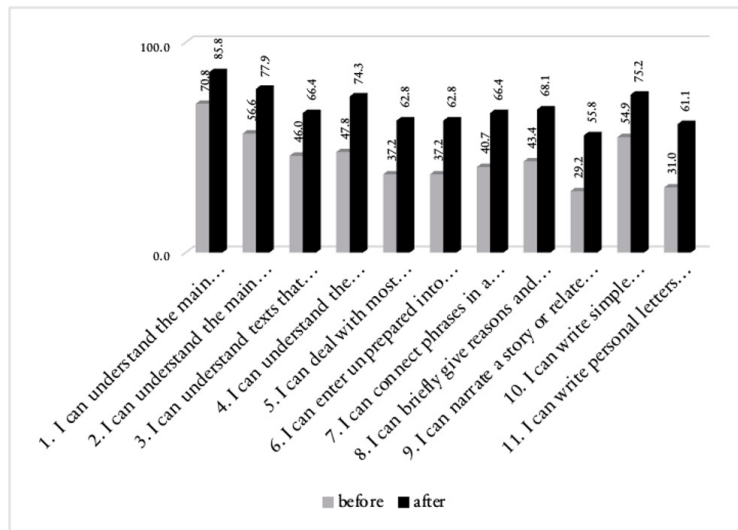


Figure 5 Comparison of the pre and post-test scores

The third research question was: What are students' perspectives regarding the use of MALL in formative assessment? Therefore, the students were required to complete three parts: a satisfaction questionnaire regarding three aspects: the use of formative assessment, knowledge gained, and using Quizizz as the selected mobile application; an in-depth interview; and the student's self-assessment of their CEFR B1 Level competency. This was carried out to comprehend students' attitudes toward the use of MALL in formative assessment to improve students' English competency at the CEFR B1 Level.

The result of the students' attitudes

Formative assessment

As demonstrated in Table 6, students' attitudes were very high in all aspects. Beginning with the formative assessment, which indicated that the students were very satisfied ($\bar{x} = 4.58$, $SD = 0.49$). When taken into consideration at the sub-question level, factors including the relation to the course content, the relevant and appropriate content, length of time, and English proficiency all received high scores ($\bar{x} = 4.63, 4.66, 4.54, 4.61$; $SD = 0.54, 0.55, 0.68, 0.63$). The threshold was crossed ($\bar{x} = 4.46$, $SD = 0.66$). However, it indicates that the degree of difficulty should either be assessed for the following formative assessment or further research should be done into each group's perceptions.

Knowledge gained

In accordance with the findings, students were highly satisfied with the knowledge they had acquired ($\bar{x} = 4.60$, $SD = 0.47$). They were all at a very high level of 4.53 to 4.67 when knowledge progress, greater English proficiency, future usage, applying English beyond the classroom, and applied knowledge in reading and writing were all considered.

MALL usage

As indicated by the result, students were very high with MALL ($\bar{x} = 4.64$, $SD = 0.47$). The appropriate application, interesting application, English improvement tool, enjoyable activity, and additional recommendation were all considered at each sub-question and were all at a very high level of 4.53 to 4.71.

Table 6
Level of perception

<i>Level of Perception</i>	<i>\bar{x}</i>	<i>SD</i>	<i>Level</i>
1. Formative Assessment	4.58	0.49	Very high
1.1 The relation with subject content	4.63	0.54	Very high
1.2 The appropriate content	4.66	0.55	Very high
1.3 Length of time	4.54	0.68	Very high
1.4 Level of difficulty	4.46	0.66	High
1.5 English improvement	4.61	0.63	Very high
2. Knowledge gained	4.60	0.47	Very high
2.1 Knowledge improvement	4.67	0.53	Very high
2.2 Better English proficiency	4.53	0.62	Very high
2.3 Future usage	4.63	0.59	Very high
2.4 Practice English outside classroom	4.58	0.66	Very high
2.5 Applied knowledge in reading and writing	4.56	0.62	Very high
3. MALL Usage	4.64	0.47	Very high
3.1 Appropriate application	4.71	0.51	Very high
3.2 Interesting application	4.65	0.61	Very high
3.3 English improvement tool	4.63	0.63	Very high
3.4 Fun activity	4.68	0.59	Very high
3.5 Further recommendation	4.53	0.66	Very high

The statistical analysis revealed a significant improvement in students' scores after using MALL for formative assessments. Nonetheless, several factors may have influenced the outcomes. One possible factor is the students' prior exposure to similar mobile applications or technology-enhanced learning environments, which may have given some participants an advantage in navigation and utilizing Quizziz effectively. Additionally, the short duration of the study may not have been sufficient to capture long-term improvements in language proficiency, particularly in complex language skills such as speaking or writing. These considerations suggest that although the results are encouraging, the conclusions should be interpreted with caution. Future research should aim to control for students' familiarity with technology and consider extending the intervention period to assess sustained improvement over time.

The result from the in-depth interview

Attitudes towards formative assessment

In exploring attitudes towards formative assessment, due to the limited number of items, students expressed a preference for this method over traditional midterm or final exams due to its perceived benefits. They appreciated its role in encouraging attentiveness during lessons and found it to be less tiring compared to longer exams. Furthermore, students noted that the process of revisiting lesson content through formative assessments helped deepen their understanding. Their feedback underscored the value of formative assessment in promoting engagement and comprehension within the learning environment. Some students commented positively, stating, "Revising the content in each part makes me understand more of the whole lesson.", while others remarked, "It is a very great way to stimulate me to pay more attention to lessons." and "I like formative assessment more than a midterm or final examination."

Attitudes towards mobile application: Quizizz

According to the students' comments, it becomes evident that the gamification elements and features of Quizizz contribute significantly to their engagement and comfort levels during formative assessments. Students appreciate the interactive nature of the platform, describing features like the time freeze, eraser option, and gap break between items as "cool". These elements not only add excitement to the assessment process but also serve to alleviate any stress or tension students may feel. Furthermore, the immediate feedback provided through funny cartoon pictures helps students quickly identify and learn from their mistakes. Overall, the simplicity of use, coupled with unique features and swift response times, positions Quizizz as a valuable tool for both reviewing lessons in a game-like format and conducting formative assessments. Reflecting on their experiences, students expressed appreciation for features like the gap break between items, with comments such as "I like the gap break between each item" and "Challenging, doing it regularly gives me the improvement".

Attitudes towards mobile application as a tool for formative assessment

A large number of the participants indicated the perceived benefits of MALL as an instantaneous, convenient, and user-friendly assessment tool, particularly for review purposes. Notably, students found Quizizz's incorporation of bonus credit for speed of response to be a refreshing departure from traditional assessment methods, enhancing engagement with the material. However, the study's outcomes imply that the effectiveness of mobile applications may vary across different demographic groups, suggesting the need for tailored difficulty levels to accommodate diverse learner needs. Students' responses echo these sentiments, with remarks such as "good for reviewing", "very fun collecting points", "relieve stress like playing", "I like the help items in the games", "enjoying and staying awake", "challenging", "modern", and "very beneficial", emphasizing its utility and convenience in language learning contexts.

Attitudes towards the knowledge gained in participating in this research

According to student responses, they experienced significant vocabulary expansion and found the interactive format of reviewing grammar concepts similar to playing a game, making the learning process both engaging and effective. Their comments, such as "many vocabularies" and "intensive grammar", underscore the perceived benefits of the approach in facilitating vocabulary acquisition and reinforcing grammar knowledge interactively and entertainingly.

It could be concluded that MALL could be used as an appropriate tool for formative assessment since it has increased self-regulated learning, which is also a key component of formative assessment (William, 2014) to reinforce learners. Students gained higher scores, particularly those in the low and moderate groups. Through enjoyable activities, it could enhance learners' proficiency in every descriptor. In accordance with previous research, Heyoung and Yeon-Hee (2012) discovered that MALL could be used in a variety of English teaching approaches to increase student's proficiency. Suwantarathip and Orawiwatnakul (2015) and Hashim et al. (2017) demonstrated the effectiveness of MALL in assisting students learn new languages. Furthermore, the result, confirmed that Quizizz, an application tool in the form of gamification, is a beneficial tool for assessment during the pandemic era and can increase students' motivation considerably, which is related to the previous research on this application due to the gamification style.

CONCLUSION AND SUGGESTIONS

This research was conducted to determine whether Formative Assessment via MALL using the selected application, Quizizz, would improve students' English proficiency to CEFR B1 Level. In both qualitative and quantitative terms, the results confirm that it is highly beneficial for formative assessments. The use of Quizizz increased self-regulated learning, a key component of formative assessment (William, 2014), and reinforced learner engagement. Notably, students in the low and moderate proficiency groups showed significant improvement in their scores, reinforcing the effectiveness of this tool. These findings align with previous research by Heyoung and Yeon-Hee (2012), who found that MALL could be applied across various English teaching approaches to enhance proficiency. Similarly, Suwantarathip and Orawiwatnakul (2015) and Hashim et al. (2017) demonstrated its effectiveness in helping students learn new languages. All interview responses were positive regarding qualitative data. The notable comments were related to the application itself, as students mentioned that the quiz format resembling a game motivated them to strive to win and earn special items. They appreciated the absence of pressure and enjoyed the fun, in contrast, and the availability of features such as double bonuses, the elimination of incorrect choices, and 50/50 answers. The prompt and responsive feedback was also highlighted as a strength of this formative assessment. Students enjoyed receiving quick feedback on their performances. Quizizz's user-friendly interface was also cited as a reason for their preference for this form of formative assessment. Furthermore, some students considered this formative assessment a "relaxing activity" in class assessment, which turned out to be the area in which they gained and learned the most. In terms of quantitative data, it was proven that the student's English proficiency had greatly improved,

with an increasing slope observed from both the first to the fourth Formative Assessment and the pre-test and post-test scores. Furthermore, an outcome that exceeded expectations was that implementing formative assessment via Quizizz proved advantageous, particularly for students with low scores, and enabled them to achieve CEFR B1 Level.

While this study has shown the effectiveness of MALL tools in improving language proficiency, future research should explore the long-term impact on skill retention across various language domains such as writing, speaking, and listening. Additionally, studies could examine MALL's effectiveness across different demographics, including diverse age groups and learners with varying learning styles. Further investigation into the use of MALL for fostering collaborative learning through group-based formative assessments could also provide insights into enhancing peer learning and interaction.

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Appendix A

Four experts' assessment of the three applications

Specialist	Quizziz	Kahoot	Quizlet	The most appropriate/ Recommendation
Assessment and evaluation	<ul style="list-style-type: none"> - Appropriate for formative assessment - Various uses include homework, classwork, quizzes, asynchronously or synchronously. - Can be applied as a teaching tool and to concurrently evaluate and assess students' competence. - The content slides are instantly interchangeable with the question slides. - Stuffed with items and various reinforcements 	<ul style="list-style-type: none"> - Appropriate for formative assessment - Various uses include homework, classwork, quizzes, asynchronously or synchronously. - Emphasis on friends' competition in the classroom like playing a game. 	<ul style="list-style-type: none"> - Appropriate for formative assessment - Various uses include homework, classwork, quizzes, asynchronously or synchronously. - Focus on reviewing knowledge rather than taking exams. 	<ul style="list-style-type: none"> - Quizziz - Each tool can be used in the assessment. It is important to consider how assessment activities should be designed and prioritize the assessment of advancement through formative assessment rather than summative.
Instructional technology	<ul style="list-style-type: none"> - Allow students to progress at their own pace. - More diversity in question formats: multiple-choice, true/false, fill-in-the-blank, and open-ended - Prompt feedback on students' performance, enabling them to improve over time by learning from their mistakes. - More options for customization, including the ability to add images, gifs, and other multimedia elements to questions. This feature enhances the learning experience and helps keep students engaged. 	<ul style="list-style-type: none"> - Provides a limited number of customizing possibilities (in the free version) compared to Quizziz's free version. - Provides feedback, and it is more focused on competitiveness and less on individual development. 	<ul style="list-style-type: none"> - With individual insight information, a dashboard, a supporting application, and a web app, the solution is simple and modest. - Emphasizes matching activities and flashcards in particular. - Provides progress monitoring; however, it is restricted to the study modes available on the platform and could not deliver as thorough of a response. - Flashcard generation is the main area where customization is restricted. 	<ul style="list-style-type: none"> - Quizziz - Each application has its unique features, such as a user-friendly design or a timed format with additional functions, etc. As a result, the teacher must decide on the best option with care for each scenario.

Specialist	Quizziz	Kahoot	Quizlet	The most appropriate/ Recommendation
Instructional technology	<ul style="list-style-type: none"> - Seamlessly integrated with various learning management systems (LMS), such as Google Classroom and Microsoft Teams. This makes it easier for teachers to incorporate quizzes into their existing lesson plans and share them with students. This makes it the most attractive option among the three. 			
Teaching English as a foreign language	<ul style="list-style-type: none"> - Very appropriate since VDO clips and sound clips can be inserted. - Various media can be searched for on Quizziz' system worldwide. - Can be done individually. - Self-control enthusiasm by using the sound system with restraint. - Affordable price (around 24 dollars a year) 	<ul style="list-style-type: none"> - Sound objects can be inserted - Prepared common activity sets available - Higher price (around 15 dollars per month for premium version) 	<ul style="list-style-type: none"> - Ideal for explaining concepts slide by slide - Words and materials should be produced and adjusted for higher education. - Merely a few of the resources accessible - There's plenty of quality English material. 	<ul style="list-style-type: none"> - Quizziz - The searchable media available might not be consistent with the lessons. Therefore, the teacher is required to both develop and select something from the system.
English teacher of English at Work Course	<ul style="list-style-type: none"> - Appropriate for formative assessments - Gamification-like activities - Both self-competition and with others - Broad range of English-language material - Quite easily used functions and easy-to-make activities - Enables the customization of question sets to meet certain learning objectives. 	<ul style="list-style-type: none"> - Engaging and interactive game-like experience for students - A large community with a vast selection of pre-made quizzes to use - Easy to use with a user-friendly interface - Supports multimedia elements like images and videos to enhance learning. 	<ul style="list-style-type: none"> - A large community with a vast selection of prepared flashcards and quizzes - Provide immediate feedback to students to track their progress and identify areas that require improvement. - Supports multimedia elements like images and audio to enhance learning. 	<ul style="list-style-type: none"> - Quizziz - Students appreciated application Quizzes over Kahoot and Quizlet, according to a pilot research.

Specialist	Quizizz	Kahoot	Quizlet	The most appropriate/ Recommendation
English teacher of English at Work Course	- A range of question formats for testing reading comprehension skills.	<ul style="list-style-type: none"> - Provides analytics for instructors to track student performance and adjust teaching strategies as needed. - Limited focus on reading comprehension skills - Limited question types (mostly multiple-choice) - The time limit on questions may not be conducive to deeper learning. 	<ul style="list-style-type: none"> - Mobile app available, making it accessible and easy to use. - Provide gamification elements like leaderboards and badges to motivate learners. - Limited focus on reading comprehension skills - Limited question types (mostly multiple-choice) - Collaborative learning features are limited compared to Quizizz and Kahoot. 	