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EXPLORING THE EFFICACY OF MOBILE APPLICATIONS IN ENHANCING ENGLISH PROFICIENCY OF EFL STUDENTS: EXPERIMENTAL STUDIES ON INDONESIAN SENIOR HIGH SCHOOL

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Abstract
This study investigates the effectiveness of mobile applications in improving English competence among Indonesian senior high school students studying English as a Foreign Language (EFL). The study used an experimental approach and involved two groups of students from senior high schools in Indonesia. The experimental group employed certain mobile applications as supplementary tools in their English learning process, whereas the control group received regular classroom instruction without the usage of mobile applications. Data were collected over a three-month period using pre- and post-tests that assessed various areas of English ability, such as vocabulary, grammar, listening, and speaking skills. The results show that students in the experimental group improved their English proficiency significantly more than those in the control group. The usage of mobile applications increased students' interest and motivation while also providing flexible and interactive learning options that older techniques lacked. Qualitative data acquired from student comments and instructor observations support the favorable influence of mobile applications on students' learning outcomes. The study shows that using mobile applications into EFL training can be an extremely effective technique for increasing English proficiency among Indonesian senior high school students. The results suggest that educational stakeholders should consider adding mobile technology into language courses to supplement and improve existing teaching techniques. Future research should concentrate on long-term impacts and investigate the potential of various types of mobile applications in diverse EFL settings.

Keywords— EFL (English as a Foreign Language), english proficiency, experimental study, Mobile Applications, Indonesian senior high school students.

Introduction

English is the predominant foreign language in Indonesia and is highly sought after in educational institutions. Students comprehend the significance and global standing of it as a guide, educational and recreational tool, and means of communication. Therefore, a teaching strategy that is of high quality and suitable should be provided (Wang & Zhang, 2019). An online collaborative learning strategy can increase the English Proficiency of high school students in Indonesia. This is in line with the findings from references Warliati et al. (2019) which emphasizes the relevance of learning techniques and critical thinking in enhancing students' proficiencies. Gradually, the incorporation of online collaboration and mobile learning technologies started to have an impact on this. The prevalence of these methods reached its highest point in 2020 as a result of the COVID-19 pandemic.

Over the past few decades, a number of pioneering methods of instruction have arisen in Indonesian high school. One of these approaches is collaborative learning (CL). CL is a

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teaching style in which students work together to attain common goals. With the use of mobile technologies, this process can be shifted to an online platform. Group work is also regarded an excellent complement to group discussions, allowing all group members to engage in the conversations. Issues of online cooperation are not examined in current research on English education (Volkova et al., 2021). This does not allow one to analyze the potential for improving the effectiveness of online collaboration.

As mobile applications are increasingly being utilized to learn foreign languages, the popularity of mobile learning technology in general is growing. Online collaboration and mobile learning have had a considerable impact on English language teaching (ELT) in recent years. Online collaboration and mobile learning have made it easier for students and teachers to access a multitude of language learning resources (Lu et al., 2022). Students can access online dictionaries, grammar tools, and multimedia content, and teachers can locate and exchange lesson plans, activities, and teaching materials with colleagues across the world. Online collaboration technologies have made it easier for students and teachers to communicate with each other, regardless of location. With systems like Zoom, Skype, and Google Meet, teachers can host virtual classes and meetings, and students may practice their language abilities with native speakers from around the world. Mobile learning has made it feasible for students to learn at their own pace and in their own time. Language learning apps like Duolingo, HelloTalk, Memrise, FluentU, and Busuu allow students to practice their abilities on their mobile devices, and many of these apps employ algorithms to personalize the learning experience based on the student's level and success.

The word "mobile learning" is defined variously in existing research, which illustrates the point that mobile learning and its applications are developing. Mobile learning, often known as m-learning, refers to the use of mobile devices such as smartphones, tablets, or laptops to enhance learning and education. It entails the delivery of educational material and resources using mobile technologies and devices. Mobile learning is such a form of organization of an autonomous and personalized educational process, where the basic or prominent technologies include mobile communication devices, with via which students can build and improve their abilities, and competencies not only during lessons in class, but also at any time convenient for them and being in any place. The lack of an acceptable definition may limit future study. Overall, online collaboration and mobile learning have altered the way English language instruction is handled and have created new options for language learners and educators. Therefore, this study intends to improve the English language teaching methodology in Indonesia high school, which contributes to the improvement of students' academic performance by incorporating mobile applications into the educational program with an emphasis on online group work.

English competency among English as a Foreign Language (EFL) students is an important feature of language acquisition, particularly in countries like Indonesia where English is a mandated subject in the secondary school curriculum. Proficiency in English writing, speaking, and listening skills can considerably improve the academic achievement and total language learning of EFL students. Factors such as self-efficacy beliefs, self-regulated learning strategies, and motivation play a key role in boosting English proficiency among EFL learners (Apridayani & Teo, 2021; Thompson et al., 2019; Anam & Stracke, 2019). Additionally, the cultural background of students might influence their listening comprehension abilities, underlining the need of meeting the different demands of EFL students (Al-khresheh, 2020).

Research has showed that the usage of mobile applications can effectively improve English competence among EFL students. These programs can give additional support for language practice, vocabulary development, and interactive learning experiences, all of which are vital for increasing English skills. Moreover, integrating self-regulated learning methodologies into the English curriculum might assist boost students' self-efficacy and overall English competence (Apridayani & Teo, 2021). Peer assessment has also been regarded as a beneficial method in EFL instruction, since it can boost students' language competency and

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provide constructive feedback to improve proficiency (Rahmatillah & Fajrita, 2022). Understanding the various factors influencing English proficiency among EFL students, such as self-efficacy beliefs, cultural background, and the implementation of effective teaching strategies like mobile applications and peer assessment, is crucial for educators and policymakers to develop interventions that can enrich the English language learning experience for EFL students in Indonesia and similar contexts.

This study intends to improve the English language teaching methodology in Indonesian high school, which contributes to the improvement of students' academic performance by integrating mobile applications into the educational program with an emphasis on online group work. The project is motivated by the necessity to test mobile applications as part of high school English learning. They were considered as a supplement to the existing educational curriculum for students of various disciplines. The goal of the study is to examine the usefulness of mobile applications in conjunction with the students' online participation in the educational environment of Indonesian high school (in the context of learning English). Tasks that required to be solved during the study, namely (1) using examinations to examine the academic achievements among students in the control and experimental groups and (2) analyzing the results and identify the tendency of indicators to improve or regress.

The uniqueness and research gap in this work can be deduced from the emphasis on "Mobile Applications" as a means of improving English proficiency among Indonesian Senior High School students who are learning English as a Foreign Language (EFL) is a relatively new and innovative approach. Although mobile applications are becoming more prevalent in education, their specialized use for English language acquisition in this context may not have been thoroughly researched. The inclusion of experimental investigations enhances the originality. Experimental studies commonly include modifying variables to see their effects. In the context of mobile applications for language acquisition, this technique can provide significant insights into their effectiveness.

The research intends to contribute to the current literature by providing empirical evidence on the effectiveness of mobile applications in improving English proficiency among EFL students in Indonesian senior high schools. This will help fill the research vacuum that has been highlighted.

Literature Review

The aforesaid improvements should be considered as an understanding by the Indonesia authorities of the critical requirement to improve the teaching approach for high school students, because of the current low performing Mobile Learning Technology (MLT) condition. Innovation in these high school English programs began along with a sequence of successes in the late 20th century as Indonesia began a process of modernising teaching. Moreover, mobile learning has become a popular study problem in education. The authors refer to an increased students' interest and achievement through the incorporation of mobile applications and technologies in general. Mobile learning is an appropriate supplement to educational strategies for boosting learning. Because mobile technologies offer considerable potential for mobility, social connection, and individuality (Li et al., 2022), language learning has become incorporated into mobile technology development. The mobile learning style permits students to remain in the educational process regardless of time and place, while working in a team and building up content for self study.

Mobile learning technologies are developing better and more convenient language learning tools and apps (Hao et al., 2019). While learning settings have been shown in study to be optimum for integrating and boosting mobile learning, there is a gap in exploring the use of MLT to app-based English. Some studies revealed that a mobile learning system with rapid web access facilitated learning and satisfied the expectations of students (simplification of assignments, rejection of notes, modernization of the educational environment, etc.). Such results can also be attained with the correct choice of learning methods and online cooperation employing mobile technologies.

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Another advantage of mobile learning is the high level of mobility and authenticity, which creates opportunities for learning outside the classroom. Videos, films, and lectures in the form of recorded videos are commonly used in listening and speaking classes among the main sources of authentic materials for language learning. This is difficult without mobile learning tools (for example, social networks like YouTube, Instagram, Facebook, Telegram, Tik Tok or any other applications with a video format). Authentic English videos as audio and visual aids have a positive impact on developing students' listening and speaking skills. However, as an autonomous instrument, a video does not have an established technique and generally accepted patterns. Classroom activities and teaching approaches can frequently be repetitious and unplanned, resulting in inefficient usage of video material in English lessons.

In recent years, there has been a lot of study focused on language learning using mobile devices (MALL). However, relatively few of them are in the context of high school teaching in Indonesia. They have concentrated on literature evaluations describing the state and trends of MALL in contemporary Indonesian high school. Although MALL research in Indonesia is developing, systematic English teaching methods have been disregarded.

At the same time, MALL's current research foundation has considerably contributed to developing trends and addressing gaps in Indonesia's high school teaching methods. For example, in line with results on applied theoretical frameworks employed in language instruction around the world, sociocultural theory has often been used to assist MALL in Indonesia. Most Indonesian research have examined the influence of MALL on overall language competency, rather than on students' individual language skills. However, most review studies in Indonesia used just general terminology to explain their benefits (e.g., mobile devices). Therefore, there is a need to research the operation of these gadgets from the computer science and technology point. MALL based educational programs had a positive impact on learning outcomes, especially on the level of lexical knowledge and listening abilities through situational activities, collaborative functions, and social contacts (Lin & Lin, 2019).

Educational systems must be built to update quickly, maintain pace with new technology and pedagogical innovations, and fulfill the demands of students. In this context, mobile devices are designed to help students acquire skills in critical thinking, problem-solving, information utilization, communication, cooperation, and to improve academic achievement. Therefore, teachers should contribute to the development of students' skills utilizing appropriate mobile applications and innovations in teaching methods.

Collaboration refers to the act of students working together in the context of solving common intellectual difficulties. It is utilized as a learning strategy when students work together towards a similar goal. Collaboration has been valuable from numerous outlooks in the online learning environment. For example, collaborative work allows students to engage in active learning that helps them gain knowledge and accomplish shared progress, fosters student innovation, and increases problem solving skills. Collaborative learning helps students establish their voice within the group and creates positive sentiments towards learning as competition is prevented. Collaboration, especially while working on group tasks, is seen as one of the benefits for students in an online learning environment. Therefore, there is an urgent need to evaluate alternative models and approaches of online collaboration in the educational process in high school in Indonesia.

Online collaboration is a relatively new pedagogical phenomena and has an interdisciplinary aspect. It has began to evolve most actively due to the COVID- 19 epidemic. It was shown that the success of online cooperation is influenced by such aspects as a limited number of students in a group, an objective approach to assessment, overcoming technological challenges, etc. The aforestated studies have focused on variables that tie online collaborative learning to psychological, pedagogical, and technological characteristics, including relations in the group, interface features, and student teacher interactions. However, there is a need to determine the influence of this strategy on the performance of high school students.

In the area of English as a Foreign Language (EFL) education, the proficiency level of learners plays a key role in numerous elements of language learning and performance. Research

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reveals that poor levels of English competence among EFL learners can considerably effect their Foreign Language Classroom Anxiety (FLCA) levels. This shows that competence levels are directly tied to learners' emotional states during language performance. Furthermore, research have indicated that learners need to reach a specific degree of competency in EFL to effectively transfer their first language (L1) reading skills (Uslu, 2020). This underscores the need of obtaining a specified competency level to harness current language skills for EFL learning. Additionally, EFL performance has been associated with affective changes in anxiety levels, demonstrating that positive affective changes are linked to strong EFL performance, while low competence is correlated with higher anxiety levels. This underlines the complicated link between language proficiency levels and emotional components in EFL learning outcomes.

In the context of EFL students, the idea of "level" often refers to the proficiency level of the students in the English language. This competency level can be tested using frameworks such as the Common European Framework of Reference for Languages (CEFR) or other standardized language proficiency exams like the TOEFL or IELTS. When analyzing the level of EFL students, it is crucial to examine their capacity to understand and communicate in English across the four language skills: listening, speaking, reading, and writing. The CEFR, for example, categorizes language proficiency into six levels: A1 (Beginner) to C2 (Proficient). At the A1 level, students may grasp and apply recognizable everyday idioms and very simple words directed at the satisfaction of actual requirements. In contrast, at the C2 level, students can understand with readily practically anything heard or read and can express themselves spontaneously, fluently, and precisely.

Research Method

The research design is an Experimental Design. An experimental approach is adopted for this study to establish a cause-and-effect link between the use of mobile applications and the increase of English proficiency among EFL students in Indonesian senior high schools. This design allows for the manipulation of variables, such as the use of certain mobile applications, and the measurement of their impact on English language learning results. By utilizing an experimental methodology, the researchers may control for extraneous variables and derive more definitive conclusions regarding the efficiency of mobile applications in enhancing English ability. The objective for using an experimental design is to give a rigorous and systematic approach to evaluating the efficacy of mobile applications in language acquisition. This methodology allows for the comparison of outcomes between a control group (not using mobile applications) and an experimental group (using mobile applications), enabling researchers to analyze the direct influence of mobile applications on English proficiency. Additionally, an experimental design permits the collection of quantitative data through pre- and post-tests, which can be statistically examined to establish the efficiency of mobile applications in boosting English language abilities among EFL students.

The results were based on the academic performance of the participants, as well as their replies about the abilities learned during the experiment. To tackle the research challenge, a survey of participants was undertaken. It was held at the start of the study and at its finish (after one academic semester). Participants were instructed to utilize at least two app of their choice. They also got the opportunity to study a few other apps and notify their teachers about it. Mobile applications that were provided to the participants: Duo Lingo, Hello Talk, Memrise, FluentU and Busuu (involves watching videos or podcasts and discussing on Zoom or Google Meet with teachers in a group, in addition to the tasks presented in the app). These programs were chosen for implementation in the course because each of them offers group assignments or a lecture style. This implies online collaboration amongst students and provides a chance for researchers to study not just the functioning of mobile technologies, but also their relationship with online collaboration. Throughout the school semester, students interacted weekly with these applications, which contain interactive activities including quizzes, writing exercises, and audio and video materials that complement the English lectures. These services were chosen as the most useful since they may be utilized both as a tool for independent work and while

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working with other students.

The participants were students of Dharma Wanita Vocational High School, studying in the second year. The key selection factor was the presence of the English language in the curriculum. Therefore, the participants were picked from English Club that studied English. At the first step, they completed a test on the level of language knowledge and among 30 students were picked who had a level of A1 and less. This is vital for this study to illustrate how the performance of individuals with the same level of English proficiency increased or worsened. They were randomly separated into two groups: control and experimental. Each had 15 persons. In the control group, English was studied without alterations, whereas in the experimental group, hours were established for collective online classes using mobile apps.

The students completed two questionnaires and two assessments at the beginning and end of the experiment, respectively. Surveys were prepared by researchers specifically for this investigation. Each questionnaire consisted of 4 yes/no questions or a scale score. Since all surveys and tests were performed online, the researchers manually analyzed only the responses and results obtained to obtain statistical data. First, they were collected in tables using Microsoft Excel, and then translated into charts. Two surveys were done in Google Forms. English proficiency examinations were offered by the international portal English Language Assessment. The assignments were accepted by the teachers, and it was possible to take the test on the official website. The reliability of the surveys was assessed using Cronbach's alpha. Scale for interpreting Cronbach's alpha values: > 0.9 – good; > 0.8 – good; 0.7– acceptable; 0.6 – uncertain; as well as. > 0.5 – terrible.

To investigate the performance of the suggested model, ANOVA was conducted. It helps one to establish the difference in the results of surveys of two groups. The Shapiro-Wilk test was used to calculate the normality of the data gathered in the study.

Speaking of the study limitations, the analysis of the results did not examine the age and gender ratio of the participants, since the major essential criterion for the results was their degree of English language competency. Also, demographics features of students that could affect their answers were neglected. Future study may incorporate a long term experiment. Consideration should be given to broadening the sample of the experiment to attract more students and increase the accuracy of the experimental results.

All processes done in human research followed the ethical norms of institutional research. Informed permission was acquired from all subjects participating in the study. Ethical problems were not violated during the study.

Results and Discussion

The first poll was designed to investigate students' attitudes toward the integration of mobile technology into the process of learning English. It produced the following results: 98% of students want and require apps in their education. Only 35% utilize English-learning applications on their own. 53% of students noted teachers' enthusiasm in using mobile technologies into the classroom. This suggests that most students are open to new educational opportunities and believe mobile technology are effective. Teachers can frequently slow down the process. However, a minimal fraction of individuals receive individual gadget training. The results of the first study stage revealed that 85% of students speak English at the B2 level, 14% at the B1 level, and 1% at the A2 level. Figure 1 also shows these results.

The second and final survey asked students to evaluate their online and group work. The examination of the responses provided the following indicators: 60% of respondents prefer teamwork, while 40% value autonomous work more. 89% of students used online collaboration through mobile applications. This means that the applications have the potential to significantly improve and update how students collaborate online. It is worth noting that, in addition to group lectures, students had the opportunity to collaborate on work, complete joint projects, and evaluate each other's knowledge. Thus, just 5% found this method of language acquisition difficult. 95% of the participants found it easy to understand the programs' interfaces and functionalities. Students were retested at the end of the semester to evaluate if their general

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English had improved as a result of using the mobile apps to study. Number of students who reached the C2 level was 7%, C1–79%, and 14% of all students remained with the B2 level. These data are presented in Figure 2.

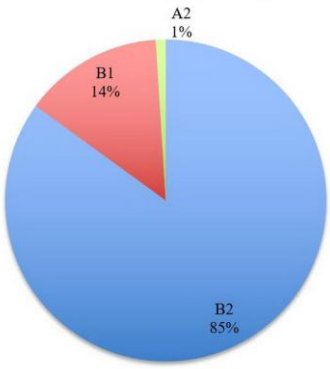


Fig. 1 First test results

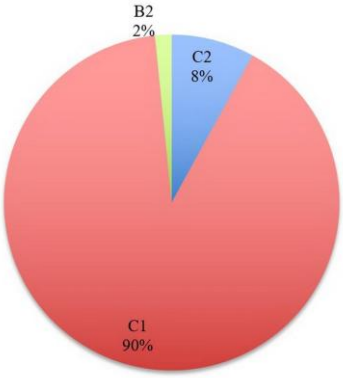


Fig. 2 Second test results

Table 1 ANCOVA Results for student academic achievements

Group	n	Value	SD	Adjusted mean	SE	*F*
Control group	70	66.44	19.75	66.89	3.59	
Experimental group	70	75.14	12.43	75.15	3.45	10.84*

* $p < 0.05$.

The Cronbach's alpha values before and after the interview were 0.88 and 0.90, respectively, indicating acceptable internal consistency. The Shapiro-Wilk test yielded a value of 0.97 ($p = 0.23$), indicating that the data followed a normal distribution. ANCOVA was employed to ensure that the two groups had similar prior knowledge. The mean for the experimental group was 74.71, with a standard error of 3.45. Accordingly, the indicators for the control group were 65.9 and 3.59. This indicates a significant difference in test scores between the two groups ($F = 10.84$, $p < 0.05$) (Table 1). The final test revealed that the experimental group participants scored higher points. Students in the control group scored 65.9, compared to 74.71. It suggests that mobile learning technologies can boost student achievement. Academic achievement scores have also improved. The primary criteria for establishing this were the average score, which was derived based on Students' assessments, which included control activities. Thus, at the start of the academic year, after completing the first module, it was 85.3. At the end of the experiment, the student's progress revealed that the average score had reached 93.1. Teachers who participated in the calculation of this measure claim that academic performance improved by 7.8 points. These indicators are relevant to the experimental group, as the indicators in the control group did not change.

The respondents' ratings improved significantly in terms of their overall level of English ability. It would also be incorrect to claim that the application of the proposed strategy was the sole factor influencing improvement in the level of the studied language during this academic semester. In general, the methodology works better when combined with other methodologies and technologies. As a result, using mobile technology for online collaboration can help students obtain better results. One of the benefits of this format is that it allows for real-time contact between an instructor and students while also providing useful feedback. It should be seen as a component of online collaboration, as effective group work is frequently supported by mentors in the form of a teacher or professor. The feedback system, as a background component, launches the constructor of learning and management models, which includes

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automated task selection and organizational forms of educational activity (didactic basis of technology), as well as the selection of teaching aids and pedagogical strategies. It is important to note that throughout the experiment, all students had quick access to the Internet's learning resources as well as their personal educational environment (access to educational presentations, training, and diagnostic materials), which they could use to overcome learning difficulties. Analyzing the results of the provided model's practical implementation reveals the feasibility of revealing the didactic potential of modern mobile learning and raises the topic of developing a new professional training model that incorporates the usage of mobile applications.

The results are consistent with earlier research, which has shown that mobile learning improves overall academic achievement. For example, at the start of the academic year, after finishing the first module, it was 85.3. At the end of the experiment, the student's average score had reached 93.1. Teachers who were engaged in the calculation of this metric claim that academic performance improved by 7.8 points. In this scenario, the students did not assess the applications or their work; rather, they emphasized their usefulness and the need of using them to learn English. To speed up the process, app makers are collaborating with colleges, schools, and universities to offer free trials of mobile learning packages. In this way, they create instructional initiatives with a strong gaming component, allowing students to completely benefit from mobile learning (Huang et al., 2021). Another study has effectively examined the benefits, game form, adaptability, and students' innovation, rather than academic performance. The results indicate that the obtained connection between these criteria can facilitate learning tasks, making them one of the important aspects that improve the effectiveness of mobile learning.

There is a study that demonstrated the educational effect of mobile applications by evaluating student performance. The main difference is that the experiment was longer (one year). Simultaneously, one mobile application was suggested, and it was utilized both full-time and part-time. Second-year students rated the innovation positively in terms of grades, students especially loved the engagement. They stated that they study more quickly and efficiently because they may utilize it at any time and from any location. These results are based on participants' self-assessed replies. When compared to previous studies, this one increased overall performance.

Another study sought to determine the effect of employing a mobile application on student vocabulary expansion. The study examined students' learning outcomes in the app and discovered that most students' overall scores on vocabulary tests increased (Hao et al., 2019). They also improved their English spelling ability. In addition, the suggested program included a pronunciation tool to assist syudents in memorizing words. Because the experiment was conducted with young people, the mobile application shaped their English knowledge rather than improved it. In any event, research has shown that this style is effective in terms of listening and sound effects. A study comparing the impact of Web 2.0 collaborative technologies to a traditional learning approach discovered that collaborative technologies have a significant impact on academic achievement and self-regulation. The trial used a experimental design. SlideShare, Wiki, WhatsApp, and YouTube have all been utilized as standalone mobile learning technologies and for collaboration. Thus, the success of mobile learning and online collaboration may be evaluated using a variety of metrics. According to studies, students who participated in study endorse the use of mobile devices in education, implying that using these technology will provide additional motivation for learning foreign languages.

Conclusion

This study's results help to expand the mobile learning knowledge base and foster online cooperation. A experimental study was carried out to assess academic performance and English proficiency among sophomore students from diverse majors. The experimental group outperformed the control group (65.9) in terms of final test score (74.71). It suggests that mobile learning technology can help students succeed. The preliminary exam determined the level of

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knowledge as follows: 85% of students knew English at the B2 level, 14% at B1, and 1% at A2. These numbers increased dramatically in the second test: 7% of students attained the C2 level, C1-79%, and 14% remained at the B2 level. These indications remained unaltered among students in the control group. Thus, mobile applications should be included as part of the educational program, as they might have a major impact on students' knowledge levels. It also piques students' interest in the language-learning process and engages them in online collaboration. In terms of group work, the selected applications enabled users to interact online, collaborate on common projects and tasks, and solve problems collectively. Students expressed a strong interest in this educational model, which elevates mobile applications to a multifunctional level. 60% of respondents prefer teamwork, while 40% value autonomous work more. These results can be added to the theoretical and empirical databases for education, teaching, computer science, and language learning. Due to the numerous aspects involved in online cooperation and English learning, more research with a large number of participants is required. Also, in the following studies, it is important to pay attention to the demographic features of students and trace the influence of these aspects on their attitudes toward mobile learning.

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