

Empirical Study on the Influence of Mobile Apps on Improving English Speaking Skills in School Students

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Abstract

Since technology provides adaptable, learner-centered opportunities for language acquisition, smartphones, and mobile applications have become indispensable in the era of Industrial Revolution 4.0, especially in higher education. Research indicates that both teachers and students view mobile learning as an effective tool for learning foreign languages and that mobile-assisted language learning (MALL) has made significant strides in offering resources and language exercises that can be completed at any time and place. The objective of this empirical study is to evaluate how mobile apps affect EFL students' English-speaking abilities and look into the relationship between skill development and app usage frequency. Additionally, it looks for potential moderating and mediating factors that affect how well mobile applications improve English speaking, illuminating the complex dynamics present in the EFL learning environment. The study used a concurrent embedded design and collected data on students' attitudes and views of smartphone English language learning apps (ELLA) through the use of a 26-item questionnaire. The questionnaire had a good degree of internal consistency with a score of 0.95 following data analysis, and t-tests were used to evaluate significant differences between groups. The data were gathered using a Likert scale. The results show that using mobile apps improves English-speaking abilities moderately but consistently, regardless of socioeconomic status. An important factor in this relationship is self-motivation. With beneficial ramifications for educators and legislators, the study highlights the potential of mobile apps as a useful tool for improving English proficiency among different student populations.

Keywords: EFL students, MALL, correlation, t-test, self-motivation, English speaking skills

1. Introduction

Smartphones and their applications have become an indispensable part of our lives in the era of Industrial Revolution 4.0, which was characterized by the continuous automation of conventional manufacturing and industrial practices employing modern smart technologies for education (Karnik *et al.* 2022; Machov *et al.* 2021). It follows that the widespread usage of mobile apps in higher education was not surprising at all, especially in light of cell phones' ubiquity, their ability to be used anytime, anywhere, and in multiple contexts as well as their interactive nature (Şad *et al.* 2022). Additionally, studies reveal that 100% of educators and 85% of college students believe that mobile learning could serve as an incentive for learning a foreign language (Tayan 2017). This is related to the generally favorable attitude that students have regarding the use of mobile devices in foreign language classrooms. The method of learning by smartphones and mobile apps was far more learner-centered in the sense of independent and customized learning than traditional classroom instruction (Song *et al.* 2021). However, it calls for accountable and proactive students who wish to raise their academic standing.

Due to the growing interest in Mobile-Assisted Language Learning (MALL), some academics are trying to effectively support further research in this area (Arvanitis and Krystalli 2021). Today, it is easily possible to implement mobile learning by giving students access to educational resources or materials via cell phones. Many language learning tasks are made possible by mobile apps, such as video messaging (MMS), audio/video recording, webcam, SMS, and internet connectivity. A wide range of technologies are being utilized to help ESL and EFL learners improve their speaking abilities. One area where notable progress has been made is in MALL. MALL, which stands for "language learning anytime, anywhere," refers to the practice of using mobile devices to do language exercises without regard to time or location constraints.

Technology aids in language acquisition by giving students access to resources, allowing them to practice speaking, and facilitating direct communication with native speakers (Zhao and Lai 2023). Concerns about the global education system, especially in nations that consider English to be a foreign language (EFL) and a second language (ESL), are becoming more and more pressing as students strive to become fluent in the language (Phan 2021; Ara 2020). That being said, speaking which is still regarded as the most crucial ability, remains the hardest to learn among all the other language skills, and it is much more difficult for many ESL and EFL students around the world. EFL students often view their incapacity as a real setback in their language study.

According to the Cognitive Load theory, integrating information and communication technology (ICT) can lessen the cognitive load and

improve second language learning (Refat *et al.* 2019). According to this theory, learners may experience cognitive overload when exposed to a large volume of knowledge or complicated content since working memory has a finite capacity. According to the interactionist hypothesis, learning a language happens when people interact and communicate with one another in various contexts (Philp and Gurzynski-Weiss 2020). During the process of learning a second language, the application of information and communication technology may help in communication and social relations. According to the constructivist theory, students should actively engage with the material covered in their classes to build their knowledge and comprehension of the world (Shah and Kumar 2019). This study seeks to provide a thorough knowledge of the impact of mobile applications on improving English speaking skills in EFL school students by synthesizing these theoretical frameworks. This understanding will help guide future educational practices and technology integration in language classrooms.

1.1 Problem Statement

A comprehensive knowledge of the overall influence on spoken English is currently lacking, despite the wide range of research that has looked at how different mobile applications affect motivation, comprehension, vocabulary, and other areas, as the literature makes clear. The body of current research sheds light on a range of mobile applications, including social media platforms, virtual reality, and game-based language learning apps. All of these apps have been evaluated for how they affect different facets of English as a foreign language instruction. However, there is still a dearth of comprehensive knowledge regarding the overall effectiveness of these apps, particularly concerning English-speaking abilities. Previous research has mostly addressed particular elements, such as motivation, understanding, vocabulary, or fear, without offering a thorough examination of the growth of English-speaking abilities. Since the effects of these apps may differ across various populations, it is imperative to carry out an empirical study with an emphasis on EFL students.

The objective of the empirical study is to thoroughly evaluate how mobile apps improve EFL students' English-speaking abilities. In particular, it looks into whether using mobile apps more frequently is associated with better skill development by examining the relationship between usage frequency and improvements in English-speaking abilities. Additionally, the research explores potential moderating and mediating factors that could impact how well mobile applications improve English speaking abilities, providing a detailed knowledge of the complex dynamics at work in the educational environment of English as a foreign language learner.

1.2 Hypothesis

H1a: There is a positive and significant relationship between the use of mobile apps and the improvement of English-speaking skills in school students.

H0a: There is no significant relationship between the use of mobile apps and the improvement of English-speaking skills in school students.

H1b: The relationship between the use of mobile apps and English-speaking skills improvement is moderated by socioeconomic status, such that the impact is more pronounced for students with higher socioeconomic status.

H0b: Socioeconomic status does not moderate the relationship between the use of mobile apps and English-speaking skills improvement.

H1c: Self-motivation mediates the relationship between the use of mobile apps and English-speaking skills improvement in school students, such that students with higher levels of self-motivation show greater improvement.

H0c: Self-motivation does not mediate the relationship between the use of mobile apps and English-speaking skills improvement in school students.

2. Literature Review

Numerous research studies have investigated how different digital tools and applications affect EFL students' acquisition of the English language. In Gamlo's (2019) study, the impact of incorporating mobile game-based language learning apps (MGBLLAs) on the English language learning motivation of female EFL students in Saudi Arabia was investigated. It investigated how students view the pedagogical worth of the free MGBLLAs. The results indicated that the students' desire to learn English was strong instrumental motivation. The study conducted by Naderi and Akrami (2018) investigated the efficacy of telegram groups for reading comprehension education among students irrespective of their gender. Twelve comprehension-based chapters were presented to the test participants via telegram groups, and identical sections were presented in person using the conventional method of teaching comprehension via reading. The follow-up test for the previous event was the identical reading comprehension exam created by the investigator. The findings showed that the Middle students' abilities to comprehend reading are significantly improved by education delivered via Telegram groups. Poláková and Klínová (2019) used pre-and post-tests to compare the use of mobile devices in the classroom with traditional approaches. This was accomplished by contrasting the test results of the untreated group with those of a study group utilizing mobile devices. The quiz-based application Kahoot was utilized in this trial effort to improve language acquisition. A smartphone app based on cognitive apprenticeship was assessed by Hao *et al.* (2019) for EFL students and evaluated its effectiveness. The study queries focused on how the software changed users' perspectives concerning learning, how students perceived the app's layout, and how their educational results changed as a result of using it. Tests, surveys, discoveries, and conversations were used to gather data. VocabGame was created by Elaish *et al.* (2019), who also investigated how it encouraged Arab students to advance their English language proficiency. Following the mobile learning action, learners in the control group showed a substantial increase in enthusiasm and mobile gaming applications boost morale and are beneficial to pupils who originally performed poorly when learning English. Klimova and Polakova (2020) talked about how students felt about a

vocabulary-learning mobile app for English. Respondents valued the constructive criticism provided by the mobile app, which assisted in preparing for their ultimate accomplishment exam. They also expressed a preference for the program's integration with other faculty-taught courses. In 2019, Kaid Mohammed Ali and Rashad Ali Bin-Hady investigated the effect of WhatsApp on the linguistic proficiency of Saudi EFL students. Metruk (2021) looked into the opinions of Slovak EFL students regarding apps for studying English by displaying their level of agreement to statements for 5-point Likert scale questionnaire. Tai *et al.*'s (2022) study looked at how vocabulary learning was impacted by mobile-rendered VR. Through the use of mobile-rendered head-mounted displays, the VR gamers engaged in dialogue with simulated individuals through the Mondly VR app. The respondent's language acquisition was assessed by assessments, perceptual questionnaires, and language tests. Most VR gamers said that acquiring vocabulary using VR was effective and inspiring. An evaluation of the Rosetta Stone app for teaching English vocabulary was conducted by Namaziandost *et al.* in 2021 and showed that teams using technology fared much better than those using a classroom environment. Liu *et al.* (2021) investigated the connection between Chinese EFL learners' language learning anxiety, burnout, grit, and perfectionism and concentrated on how nervousness and perseverance, in a mobile-assisted setting, modulate the relationship between excellence and EFL student burnout. Parsa and Anjomshoa (2022) looked into how self-efficacy and grammar achievement were affected by a mobile grammar learning program such as telegram and Skyroom. Ginting and Fithriani (2021) assessed how the Hello English app affected the vocabulary mastery of eighth-grade EFL students.

Using a mixed-method design, Kusmaryani *et al.* (2019) examined the effects of smartphone apps on speaking abilities and critical thinking. The data were collected using a convergent parallel combined approach design, yielding both qualitative and quantitative findings. Pupils' ability to speak and analytical thinking throughout their English studies were favorably optimized by smartphone apps employed as learning aids. According to the discussion, despite experiencing issues with intermittent internet access, pupils were highly excited in investigating and using mobile educational tools. The impact of mobile-assisted instruction on the speaking abilities of Iranian female EFL learners as well as their opinions of this method were investigated by Ataeifar *et al.* (2019) by assigning three months out-of-class activities consisting of mobile-assisted training on course-related topics via Voice Thread and Twitter. The attitudes of Thai EFL learners towards mobile apps for language learning and their use across proficiency levels were investigated by Thedpitak and Somphong (2021) by examining the degree to which language acquisition was aided by the usage of smartphone apps. Chen (2022) examined how enhanced instruction using technology might lower the PSA of EFL students. Following their teaching, students' reported PSA levels decreased, however, only the VR-facilitated group attained significance, while there were no changes in the groups' overall verbal outcomes. The WikiTalki smartphone software was created by Ko and Lim (2021) to enhance English-speaking instruction in South Korean classrooms and examined the usefulness of the software concerning pupil involvement, confidence, oral communication performance, and acknowledged achievement while speaking English. Chang and Lan (2021) investigated how college students' views and performance in English were affected by a flipped EFL classroom using the LINE mobile app. Using pupil responses from an English-speaking preliminary and the follow-up test, a survey, and group discussions, a pilot study methodology was used. The strategy was deemed effective after a comparison of the respondents' English-speaking abilities during the pre-and subsequent tests. The study conducted by Lu *et al.* (2023) examined how a mobile application affected the memory and vocabulary acquisition of Chinese postsecondary EFL students. Together, this research advances our knowledge of how technology can improve language proficiency, attitudes, and overall language learning outcomes in EFL environments.

3. Research Methodology

Concurrent embedded design is employed to address queries requiring various forms of data (Malik & Hamied, 2014). One of the most popular (Ponto, 2015) study techniques for gathering data was the questionnaire, which was used to obtain information from the students on their attitudes and perceptions of smartphone ELLA. Quantitative analysis and the usage of structured questionnaires are closely related (Cheung 2021). The purpose of the questionnaire was to gather information on the function that applications play in language practice and acquisition while also focusing on the development of individual language systems and skills. The questionnaire was framed referring to Chen *et al.* (2019) and had about 26 statements. The Results and Discussion section below contains the questionnaire and its results. The scale was five items long, with the options being "strongly disagree" and "strongly agree." A Likert scale, with 1 denoting a strong disagreement and 5 denoting a strong agreement, was used to collect the quantitative data (Joshi *et al.*, 2015). Questionnaires were distributed via social media among selected individuals (n=660) from various countries (Table 1) who were learning English as a foreign language. Participants were asked to rate their agreement with a series of statements. The participants were notified in writing—through a separate document in which they also provided their consent—that their names would be kept private to ensure their anonymity before they began the questionnaire. With an internal consistency score of 0.95, the questionnaire was considered dependable for the objectives of this study. Following data collection t-tests—a two-sample statistical analysis that assumes unequal variances—were used to further analyze the data. An inferential statistic known as the t-test was used to determine whether there is a significant difference between the means of the two groups (Liang *et al.* 2019).

4. Result

4.1 Frequency Table

4.1.1 Sociodemographic Information

Table 1. Sociodemographic information of responded participants

S.No	Demographic factors	Frequency (%)	Skewness	Kurtosis	
1	Age	<10	30	-0.091	-1.452
		10-15	35		
		>15	35		
2	Gender	Male	52.1	0.085	-1.999
		Female	47.9		
3	Country of origin	Canada	14.8	-0.035	-1.212
		Australia	13		
		UK	13.8		
		South Africa	15.2		
		Netherlands	15.6		
		Denmark	14.4		
		Finland	13.2		
4	Years of English Learning (EFL)	0-2	35.2	0.091	-1.459
		2-4	34.7		
		>4	30.2		
5	Income of parents	Low income	24.5	0.040	-0.808
		Middle income	54.2		
		High income	21.2		
6	Geographic location	Urban	26.1	-0.043	-1.173
		Suburban	45.2		
		Rural	28.8		
7	English proficiency level	Beginner	35.2	0.223	-1.154
		Intermediate	43.3		
		Advanced	21.5		
8	Smartphone ownership	Yes	65.0	0.630	-1.607
		No	35.0		
9	Frequency of mobile usage	Daily	44.4	0.497	-1.274
		Weekly	11.2		
		Monthly	15.6		
		Rarely	14.2		
		Never	14.5		
10	Internet access quality	High speed	62.1	0.731	-1.030
		Moderate speed	26.5		
		Low speed	11.4		

Table 1 provides a comprehensive overview of the sociodemographic attributes of the student participants in the study investigating how mobile applications impact schoolchildren's ability to speak English. Participants are categorized according to age, with the largest age group (35%) being those between 10 and 15, indicating that this study focuses on a critical juncture in a student's academic career. The gender distribution of participants reveals a minor bias towards males, who make up 52.1% of the total, while females make up 47.9%. The study's global and multicultural nature is reflected in the students' varied backgrounds, which include Canada, Australia, the UK, South Africa, the Netherlands, Denmark, and Finland. This could have an impact on how the students use mobile language learning apps.

The classification of language proficiency into beginner, moderate, and advanced levels highlight the necessity to look into how mobile apps can be able to accommodate a range of language proficiency levels. The years that the participants have studied English are likewise evenly dispersed, with 30.2% having studied the language for more than 4 years, 35.2% in the 0–2-year range, and 34.7% in the 2–4-year range. This equilibrium is crucial because it makes it possible to investigate the efficacy of mobile apps for users with varying degrees of language proficiency. Another important consideration is the participants' families' economic standing; 54.2% of the homes are middle-class. The accessibility and availability of technology and resources for language acquisition can be strongly impacted by income levels. Urban, suburban, and rural geographic settings all provide an intriguing dynamic for the study because kids from different backgrounds may have different exposure to and experiences with mobile apps. Participant smartphone ownership is high, at 65%, indicating how commonplace this technology is among today's youth. The students' varied mobile usage patterns, which span from every day to never, demonstrate their varied smartphone habits and levels of engagement, which may have an impact on how widely they use language learning apps. A crucial component in guaranteeing the seamless and successful use of mobile apps for language learning is the quality of internet access, particularly high speed (Figure 1).

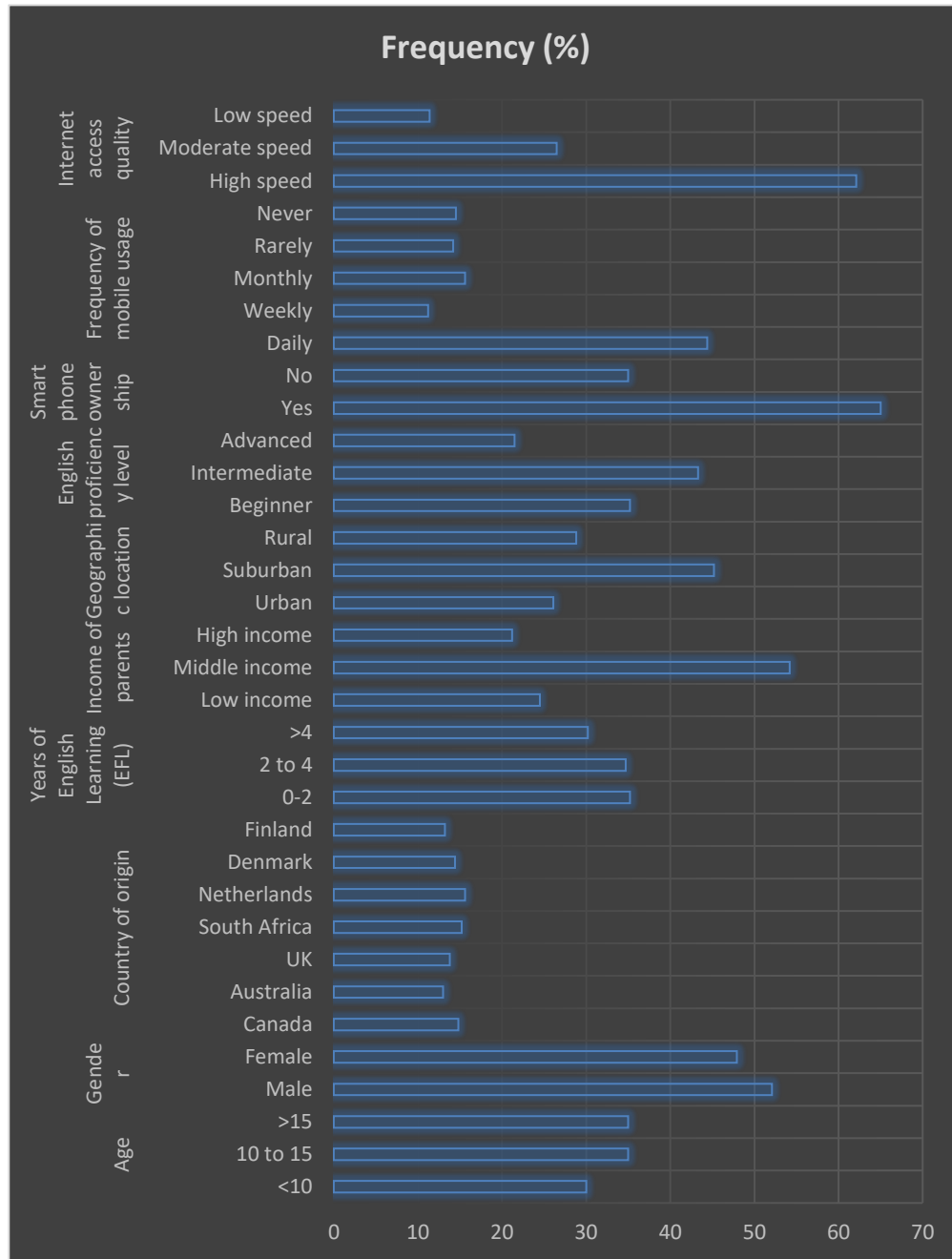


Figure 1. Bar diagram frequency diversity among various sociodemographic variables

4.2 Effectiveness and Factors of English Language Learning among EFL Students

Table 2. Questionnaire response and their mean score

Factors	Number of questionnaires	Mean score (1-5)
Improvement in English speaking skills among EFL students by using mobile apps (A)	10	3.84±1.06
Impact of socioeconomic status on improving the English language among EFL students (B)	7	3.85±1.04
Self-motivation among EFL students to learn English through mobile apps (C)	9	3.85±1.02

A mean score of 3.84±1.06 was obtained from 10 surveys used to evaluate the "Improvement in English speaking skills among EFL students by using mobile apps". This indicates that, while there is a noticeable degree of heterogeneity in their responses, students generally experience a moderate level of progress in their English-speaking abilities when utilizing mobile apps. The impact of socioeconomic position on English language improvement among EFL students is examined through seven survey questions; the mean score of 3.85±1.04 indicates a comparable moderate degree of impact and slightly less variability. Based on nine questionnaires, the third element examines

"Self-motivation among EFL students to learn English through mobile apps" and produces a mean score of 3.85 ± 1.02 , which suggests a similar degree of self-motivation with comparatively little answer variability. Overall, these results indicate that, with some variation in responses, EFL students believe that using mobile apps has improved their English-speaking abilities and self-motivation somewhat, while the influence of socioeconomic status on their language learning experiences seems to have a similar but somewhat less variable effect (Table 2).

Table 3. t-test

One-Sample Test						
Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
A	121.068	659	0.000	3.84152	3.7792	3.9038
B	128.228	659	0.000	3.85022	3.7913	3.9092
C	126.335	659	0.000	3.84916	3.7893	3.9090

A- Improvement in English speaking skills among EFL students by using mobile apps.

B- Impact of Socioeconomic status on improving English language among EFL students.

C- Self-motivation among EFL students to learn English through mobile apps.

The statistical test results, which compare three groups to a null hypothesis with a test value of 0, are displayed in the table (Table 3). There are notable and statistically significant variations between the three groups' t-values and p-values from the null hypothesis. The fact that the mean differences are constantly positive suggests that the means of the groups exceed the null hypothesis. The significant differences are further supported by the tight 95% confidence range. The table displays the findings of a one-sample test designed to investigate the connections between mobile app usage and the development of English-speaking abilities among EFL (English as a Foreign Language) students, taking into account the influence of self-motivation and socioeconomic position. The results show that the mean difference in English-speaking abilities for group A (3.84152) is substantially different from the test value of 0, supporting hypothesis H1a, which proposes a positive and significant association between the use of mobile apps and the improvement of English-speaking skills. This indicates that H1a, which proposes that mobile app use has a favourable and substantial impact on EFL students' English-speaking abilities, is well supported by the available data. In support of hypothesis H1b, which states that socioeconomic status moderates the relationship between mobile app use and improved English-speaking skills, the test results for groups B and C also demonstrate significant mean differences, indicating that socioeconomic status does not moderate the relationship between using mobile apps and improved English-speaking skills. Since there is no proof that socioeconomic status has a moderating influence, this runs counter to H1b. The test findings for group C show a substantial mean difference, supporting hypothesis H1c, which states that self-motivation mediates the association between mobile apps and the improvement of English-speaking abilities. Put differently, when utilizing mobile apps, pupils who possess higher degrees of self-motivation demonstrate greater growth in their English-speaking abilities. Overall, this analysis's findings reject H0a, reject H0b, support H1c, and support H1a. This implies that, regardless of socioeconomic background, the use of mobile applications is positively correlated with EFL students' improvement in their English-speaking abilities, and that self-motivation mediates this association. These results have ramifications for educators and policymakers who want to use mobile apps to help EFL students improve their English-speaking abilities.

Table 4. Correlation of impact of mobile apps and the variables affecting the roles

	A	B	C
A	1		
B	.806**	1	
C	.863**	.831**	1

** Correlation is significant at the 0.01 level (2-tailed).

The given correlation matrix (table 4), which offers insightful information about the relationships between important variables pertinent to the development of English-speaking abilities among EFL students, further supported the statements that were previously explained. Interestingly, there is a significant positive correlation found between the use of mobile apps and the impact of socioeconomic status and self-motivation. This means that students from higher socioeconomic backgrounds are more likely to use mobile apps for language learning and to be more driven to learn the language. Furthermore, there is a strong positive association between self-motivation and socioeconomic position as well as the usage of mobile apps. These results imply that students' motivation to use mobile apps to improve their English language skills is significantly influenced by their socioeconomic class and that their involvement with language-learning technology is strongly correlated with their level of self-motivation.

4.3 Impact of Socioeconomic Status and Self-Motivation on the Improvement of English-speaking Skills among EFL Students

Table 5. Regression Analysis 1

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	284.347	1	284.347	1218.455	.000 ^b
	Residual	153.555	658	.233		
	Total	437.902	659			
a. Dependent Variable: Improvement in English speaking skills among EFL students by using mobile apps (A)						
b. Predictors: Impact of socioeconomic status on improving the English language among EFL students (B)						

Table 6. Regression Analysis 2

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	325.984	1	325.984	1916.556	.000 ^b
	Residual	111.918	658	.170		
	Total	437.902	659			
a. Dependent Variable: Improvement in English speaking skills among EFL students by using mobile apps (A)						
b. Predictors: Self-motivation among EFL students to learn English through mobile apps (C)						

The ANOVA tables (Table 5,6) that are attached provide strong proof of the significant impact that mobile apps have on enhancing English speaking abilities among EFL (English as a Foreign Language) students. The first analysis revealed that students' socioeconomic level (B) had a considerable impact on their progress in their English-speaking ability (A), as evidenced by a highly significant F-statistic and a nearly zero p-value. The second analysis, which focused on students' self-motivation (C), also demonstrated that mobile apps have a significant influence on improving English language proficiency. Both investigations highlight how effective mobile applications are at helping EFL students improve their language abilities and how motivated learners may gain a great deal from these technological resources regardless of their financial situation.

5. Discussion

In several disciplines, including finance, science, and politics, English has progressively become the official working language over time. Thus, being proficient in English is essential for increasing a company's dependability and efficiency; additionally, it allows students to expand their job options. There are now prospects for the educational system to extend outside the classroom and into virtual online environments thanks to the development of the Internet, smartphones, and computers. Online learning has become a popular option for teaching and learning because of how easily accessible the Internet is. In the condition of mobile application-assisted English language learning, bits of knowledge are scattered everywhere. This makes it easier for students to pick up English language skills and creates a strong foundation for enhancements in student motivation, learning methods, and results. Furthermore, the use of mobile technology gave the participants access to real-world social interactions and realistic communication activities, which are both the means and the end aim of learning a new language in the context of Communicative Language Teaching.

This study explores how mobile apps impact English proficiency in schoolchildren. The data reveals a moderate but consistent improvement in English-speaking skills with mobile app use, unaffected by socioeconomic status. Self-motivation plays a significant role in this relationship. The study underscores the potential of mobile apps as a valuable resource for enhancing English skills among diverse student populations, with positive implications for educators and policymakers. The findings corroborated the findings of other academics that examined how well it worked to include online activities in students' assignments and came to the conclusion that using mobile apps could help students become more proficient and grasp the material (Ataeifar *et al.* 2019; Ginting and Fithriani 2021)

At the emotional level, the majority of students expressed optimism and said that, in comparison to learning through their English textbook, using the APP to learn English was more engaging and fostered teamwork. According to Zheng *et al.* (2017), students' attitudes and views of language learning activities that used mobile devices tended to be positive. According to Naderi and Akrami's 2018 research, the reading comprehension skills of Intermediate students are significantly improved by instruction delivered via telegram groups. WhatsApp encouraged students to utilize the language and decreased their fear, according to research by Kaid Mohammed Ali and Rashad Ali Bin-Hady from 2019. It also shows that EFL students have a positive opinion of WhatsApp as a useful tool for language acquisition.

Global language competency is one of the traditional language learning objectives that could be enhanced by learning strategies (Seker, 2016). Mobile devices allow for seamless learning that is integrated into students' everyday lives rather than being isolated from them (Stockwell 2021). According to a recent study, language speaking and listening abilities may benefit via mobile augmented reality and automatic speech recognition-based resources (Tsai, 2023). Because they could manage the learning process at their own pace, convenience, purposes, preferences, and styles, mobile learners outperformed traditional ones, according to a recent study. This could have improved their efficacy and efficiency in learning the language, resulting in better learning results (Quan *et al.*, 2022).

With the use of mobile devices, students may be able to learn a language more quickly, retain new vocabulary and expressions, and achieve better learning results. This could pique pupils' interest in the smartphone app that they have downloaded. According to Sun and Gao (2020), intrinsic motivation has the potential to positively impact students' behavioral intention through perceived usefulness and task technological fit. Students now have a highly portable alternative to bulky books and purses thanks to mobile learning, which is made possible by flexible smart gadgets that hold customized learning materials. They could attend in-person sessions without having to bring bulky books and

dictionaries, as they would have in the past. Only a small, light, and portable smartphone was required for them to carry (Zhonggen and Xiaozhi 2019). Additionally, there was a favorable relationship found between student motivation and interest in mobile learning (König, 2021). Strong students' interest in learning the English language was piqued by both internal and external incentives, which also promoted cognitive and metacognitive learning methods like self-control, independent study, and self-directed learning. Furthermore, the majority of students indicated in their journals that they preferred to use the app to study vocabulary. These findings align with those of Klimova and Polakova (2020), who found that students' perceptions of utilizing apps to acquire vocabulary were good. Its comfort, enjoyment, ease of use, helpfulness, innovation, high efficiency, and satisfaction might be considered the fundamental causes (Singay *et al.* 2022).

6. Conclusion

The empirical research on how mobile applications affect EFL students' English-speaking proficiency has illuminated the major advantages of using technology in language instruction in the context of the Fourth Industrial Revolution. The results verify that mobile-assisted language learning (MALL), which offers flexible, learner-centered options for language acquisition, has emerged as a vital instrument. It has been shown that both teachers and students believe that mobile learning is a useful tool for improving language proficiency. The study's findings show that students' English-speaking skills have steadily and somewhat improved, regardless of their socioeconomic background. This link highlights the importance of self-motivation and the necessity of inner drive and excitement in the language learning process. The results highlight the potential of mobile applications as useful tools for raising English proficiency among a variety of student populations, which has significant ramifications for educators and policymakers. In the end, this research supports the necessity for higher education to keep integrating technology and personalized learning approaches to enable more accessible and successful language instruction in the context of Industry 4.0.

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Authors contributions

Kewin Anten Raj J.R has conceptualised, collected resources, analysed, and wrote the original draft.

Dr Anu Baisel is the corresponding author and supervisor. He edited, reviewed, and developed the final draft.

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Data sharing statement

No additional data are available.

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