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From Distraction to Dedication: Students' Engagement in Using Smartphones for Learning English

Dwi Ima Herminingsih [1] [ID] *, Hesty Puspita Sari [2], Erna Iftanti [3]*

[1] *Public Administration Department, University of Tulungagung, Tulungagung 66219, Indonesia*

[2] *English Language Education Department, Universitas Islam Blitar, Blitar 66131, Indonesia*

[3] *English Language Education Department , UIN Sayyid Ali Rahmatullah, Tulungagung 66221, Indonesia*

ABSTRACT

Applying smartphone technology to improve English skills can be highly beneficial and enhance students' English learning experiences. Despite the widespread use of smartphones among Indonesian students, many do not fully utilize them for educational purposes. This study investigates the extent to which active participation in smartphone technology can improve the English skills of Indonesian students. Four hundred junior and senior high school students from state and private schools in East Java Province participated in this research. In-depth interviews with ten teachers were conducted to collect qualitative data. A mixed-methods approach was used to comprehensively address the research question, potentially increasing the validity of the study's findings. The results show that students from state schools were more motivated and engaged in using smartphones to learn English than those from private schools. Approximately 84% of students use smartphone-based learning to improve their English skills, while only 16% do not. In sum, student engagement was influenced by self-awareness supported by the environment, such as schools providing Wi-Fi, teachers encouraging smartphone use, and introducing smartphone-based learning platforms. Given the limited scope of this research, future studies may focus on broader areas and specific smartphone-based learning platforms to further enhance students' English skills.

Keywords: Student Engagement; Smartphone-Based; English Learning

1. Introduction

The integration of smartphones into education has rapidly transformed traditional teaching and learning dynamics. With their accessibility and multifunctionality, smartphones have become powerful tools for enhancing students' engagement, particularly in language learning[1]. The use of smartphones in learning English is gaining momentum, as they offer interactive applications, real-time feedback, and convenient access to educational resources. Research has shown that mobile devices, when utilized effectively, can promote active participation, increase motivation, and improve learning outcomes[2]. Given the widespread use of smartphones among students, they represent a significant opportunity for educators to engage students in innovative language learning experiences.

Numerous studies have explored the use of smartphones in enhancing language learning, highlighting their role in fostering student engagement[3]. Mobile-assisted language learning (MALL) has proven effective in offering personalized learning experiences through apps and other mobile platforms. For example, smartphones enable students to engage in listening and speaking exercises, access online dictionaries, and connect with peers globally through language exchange apps[4]. Additionally, research suggests that smartphones can support collaborative learning by encouraging students to work together on projects or language tasks[2]. Despite these benefits, the degree to which smartphones truly enhance students' engagement in learning English remains underexplored in certain educational contexts.

Although the potential benefits of smartphones in language learning have been well-documented, there is a lack of in-depth research focusing on the specific factors that influence students' engagement with smartphones in English learning, particularly in secondary education. While studies have identified general advantages such as improved accessibility and motivation, little attention has been paid to how engagement levels vary based on students' attitudes, usage patterns, and the type of tasks they undertake using their smartphones[3]. Moreover, research often overlooks the potential challenges students face, such as distractions or overreliance on mobile devices, which may impact their learning effectiveness. This gap highlights the need for more focused investigations into how smartphone usage can specifically enhance student engagement in English learning.

Understanding how smartphones can be effectively integrated into English language learning is crucial for educators seeking to adapt to the digital age. By examining the specific factors that affect student engagement, this study will contribute to the growing body of literature on mobile-assisted language learning (MALL) and offer practical recommendations for teachers. Ultimately, the findings of this research will help to better equip educators with the knowledge necessary to leverage smartphones as tools for enhancing language learning and fostering greater student engagement in the classroom. Previous studies above have not provided adequate information on students' engagement in using smartphone-based learning English. As such, this study aims to investigate students' engagement in using smartphone-based technology to improve their English skills. The research question is formulated as follows:

1. How did junior and senior students of Indonesia improve their English skills using smartphones?
2. How did teachers perceive the use of smartphone-based for enhancing students' engagement in learning English?

2. Literature Review

2.1. Theoretical Framework

Sociocultural theory, developed by Lev Vygotsky, emphasizes the essential role of social interaction, cultural artifacts, and language in cognitive development. According to this theory, learning occurs first on a social level before it is internalized individually[5]. In the language learning context, learners acquire language more effectively through interaction with more knowledgeable others in a culturally meaningful setting. Smartphones, as modern cultural tools, support this process by facilitating communication, access to authentic language materials, and collaborative opportunities—thereby fostering higher levels of student engagement[6].

Smartphones support mediated learning, a key component of sociocultural theory, by enabling students to use various tools such as dictionaries, translation apps, and grammar-checking software while engaging in English learning tasks. These digital tools act as mediators between learners and language input, helping students stay engaged by providing immediate feedback and supporting learning at their own

pace [7]. The scaffolding made possible through smartphone applications aligns with Vygotsky's concept of the Zone of Proximal Development (ZPD), where learners perform tasks with guidance that they could not accomplish independently.

Moreover, smartphones foster collaborative dialogue, a central mechanism for cognitive development in sociocultural theory. Mobile messaging apps, discussion boards, and social media platforms create spaces for peer interaction, where learners can co-construct knowledge, share resources, and provide mutual support [8]. These collaborative interactions stimulate engagement by promoting active participation, negotiation of meaning, and learner autonomy. Within the ZPD framework, peers often serve as sources of support, enabling each other to stretch their linguistic and cognitive capacities.

Finally, smartphones allow learning to extend beyond formal classroom boundaries into everyday life, in line with the sociocultural notion that learning is situated and occurs across diverse contexts. Through podcasts, videos, social networking, and educational games, students are exposed to English in authentic, culturally relevant scenarios, enhancing both their motivation and engagement [4]. This seamless integration of formal and informal learning contexts offers learners ongoing opportunities to use and reflect on language, thereby supporting continuous and socially mediated development.

2.2. Previous Research on the Use of Smartphones and English Learning

Smartphones have become essential tools in education, offering a wide array of resources for language learners. Studies have shown that smartphones can enhance student engagement by providing immediate access to language learning tools, such as educational apps, online dictionaries, and multimedia resources. Kukulska-Hulme emphasized that smartphones offer students personalized learning experiences [2], allowing them to engage with language materials at their own pace and from any location. Furthermore, mobile-assisted language learning (MALL) has been found to promote higher levels of motivation and active participation in learning [4]. These technologies, by integrating various learning modalities such as listening, reading, and speaking exercises, can create a dynamic and engaging environment for students.

Several studies have highlighted the role of smart-

phones in improving student engagement by increasing interaction with language content. Lai and Hwang found that when students were provided with mobile learning tools, their engagement levels increased significantly [3], especially in tasks that involved collaboration and interactive activities. Additionally, smartphones facilitate collaborative learning, enabling students to interact with peers and native speakers through language exchange apps or discussion platforms [7]. These forms of engagement are seen as essential for enhancing students' overall language proficiency. However, while these studies identify engagement as a key outcome of smartphone use, there remains a lack of research on how specific engagement factors, such as individual attitudes or usage patterns, influence learning outcomes.

The role of the teacher in guiding smartphone-based learning is critical, as the type of tasks assigned can significantly impact engagement. Studies have indicated that teachers who incorporate smartphones into their lessons can offer more engaging and dynamic language-learning experiences [1]. Tasks such as interactive quizzes, vocabulary games, or real-time translation tools were found to engage students more effectively than traditional methods [3]. However, despite these promising findings, there is limited research that focuses on how different teaching approaches or task designs affect students' engagement with smartphones. Furthermore, understanding how teachers can leverage smartphones in a way that aligns with student preferences remains an area that requires further exploration.

Despite the advantages of smartphone use in language learning, various challenges can hinder student engagement. Research has pointed out that students may encounter distractions from non-educational apps, social media, and gaming [1]. Moreover, over-reliance on smartphones can lead to issues such as decreased attention spans or reduced face-to-face interaction, which are detrimental to the overall learning experience [4]. These challenges contribute to the gap in the literature, as few studies examine how these barriers specifically affect engagement in English language learning contexts. Understanding these issues is crucial for addressing the negative consequences of smartphone use and ensuring that students remain focused and engaged with educational content.

While existing studies have provided valuable insights into the general benefits of smartphone use in language learn-

ing, there is a noticeable gap in research that investigates how students' engagement with smartphones varies across different educational settings and cultural contexts. For example, Lai and Hwang noted that engagement levels might differ based on the resources available to students or the socioeconomic context of their schools [3]. Research focusing on secondary school students in regions such as East Java, Indonesia, is particularly sparse. A more contextualized approach is needed to explore how different factors, including school type, geographical location, and student attitudes, influence engagement with smartphones in learning English. This study aims to fill this gap by exploring these contextual factors and providing a deeper understanding of how smartphones can be integrated effectively into the language learning process.

3. Method

3.1. Research Design

This study employed a mixed-methods approach of explanatory sequential design to investigate students' engagement in using smartphone technology to improve their English. Miles & Huberman suggest that in the explanatory design, quantitative data should be gathered first, followed by qualitative data to explain the results or specific components of the findings [9]. In other words, the following qualitative method typically helps clarify perplexing, contradictory, or typical survey results [9]. Qualitative data was utilized to substantiate and enrich the findings derived from the quantitative survey. The researcher first conducted a survey and analyzed the results. Based on the quantitative data obtained, participants were then selected for follow-up interviews. However, not all survey participants were interviewed. Interview data were manually analyzed using Miles and Huberman's framework. The researchers drew conclusions from the qualitative findings and interpreted the results by integrating both quantitative and qualitative data. **Figure 1** illustrates the explanatory research design and its implementation in this study.

3.2. Research Site and Participants

The study was conducted at several private junior and senior high schools in East Java Province, Indonesia, focus-

ing on first- and second-grade students. A total of 400 students and 10 English teachers participated in the study, with 200 students drawn from private junior high schools and 200 from private senior high schools. The teacher participants consisted of five from public schools and five from private schools. The researcher employed a purposive sampling technique, selecting participants based on specific criteria relevant to the study's objectives. According to the criteria proposed by Miles and Huberman, purposive sampling involves the deliberate selection of subjects based on particular considerations or qualifications [10].
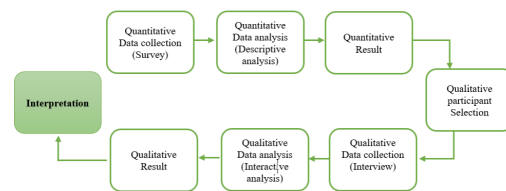
Figure 1. Explanatory Sequential Design.

The English teachers selected for the interviews were required to have at least one year of teaching experience at either a public or private secondary school. They had to demonstrate prior use of smartphones as part of their English language teaching strategies, particularly for enhancing student engagement. Additionally, teachers were chosen from schools in both urban and semi-urban areas with varying levels of access to digital resources, to ensure a broader representation of teaching contexts.

3.3. Research Instrument

Adopting the rigor of a mixed methods approach with an Explanatory sequential design can considerably increase the validity of the research instruments used in the study [11]. The instruments used in this study were questionnaires and interview protocol. The questionnaire was examined and validated by three experts. They checked the suitability of the content and clarity of the instructions. They suggested improving several items and also to delete unnecessary items. The questionnaires used a points Likert scale. Each statement was answered from strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The interview protocol had been validated by the validator and then analyzed using the Content Validation Index. The quantitative component involves surveying 400 students from state and private junior and senior high schools in East Java Province, Indonesia. For

the qualitative component, semi-structured interviews and focus group discussions had been conducted with a purposive sample of 30 students, representing different levels of students. In this research, the quantitative data discovered the percentage of students' engagement on the elements of smartphone usage, language app, perceived effectiveness, and challenge. The qualitative data involved the teacher's experiences and reasons for supporting students' engagement to improve their English skills.

3.4. Data Collection Procedure

To investigate how junior and senior high school students in Indonesia improve their English skills using smartphones, a **survey** was conducted with a total of **400 students** (200 from junior high and 200 from senior high) from both public and private schools. The survey aimed to collect data on the types of smartphone activities students engaged in (e.g., using English-learning apps, watching English videos, chatting in English), the frequency of use, and their self-reported improvements in specific English skills (listening, speaking, reading, writing). The questionnaire was developed in both English and Bahasa Indonesia to ensure clarity and accessibility. It consisted of multiple-choice and Likert-scale items and was administered **over a four-week period in January 2025**, using both online (Google Forms) and printed formats depending on school infrastructure. Each student took approximately **20–30 minutes** to complete the survey. Prior to data collection, necessary permissions were obtained from school principals, and informed consent was collected from students and guardians. The survey responses were anonymized and later analyzed statistically to identify trends and correlations in smartphone use and English skill development.

To further explore how teachers perceive the use of smartphones in enhancing students' engagement in learning English, **semi-structured interviews** were conducted with **10 English teachers—five from public schools** and five from private schools. These teachers were selected based on their experience and willingness to participate in discussions about mobile-assisted language learning practices. The interviews were conducted **in February 2025**, shortly after the student surveys were completed, to allow for cross-referencing and triangulation of data. Each interview lasted between **30 and 45 minutes** and was conducted in person or via Zoom, depending on the teacher's availability and location. The interview questions focused on teachers' observations of student behavior, benefits and drawbacks of smartphone use in class, and the strategies they used to manage and guide digital engagement. All interviews were recorded with consent, transcribed, and thematically analyzed using Miles and Huberman's model [9]. The insights gained helped contextualize student data and deepen understanding of the pedagogical implications of smartphone integration in English language learning.

3.5. Data Analysis

There were two phases in collecting the research data. The first phase was the quantitative phase, where the researchers collected the data using a survey and analysed it using descriptive analysis in the form of mean and percentage. The second phase was qualitative, where the researchers collected the data using interviews and analysed the results using interactive analysis. While collecting the data, the researchers first surveyed the students' motivation in implementing smartphone-based learning. Following that, the researchers interviewed the teachers to understand their efforts in supporting the use of smartphone-based learning. In interviewing the teachers, researchers used audio recordings. A questionnaire was given to make the data more valid. It consisted of 15 questions.

Using **Miles and Huberman's** framework for thematic analysis [9], which includes data reduction, data display, and conclusion drawing/verification, the qualitative responses from teachers were systematically analyzed to explore their perceptions of smartphone-based learning for enhancing students' engagement in English. During **data reduction**, key statements were coded and categorized into three major themes: *facilitation of interactive learning*, *increased student motivation and autonomy*, and *challenges in classroom management and distraction*. These themes were then organized visually during the **data display** phase, allowing patterns and relationships to emerge more clearly. The **conclusion drawing and verification** stage involved reviewing the consistency of interpretations and validating them against the data. To ensure credibility, **triangulation** was applied through the use of multiple data sources, including interview transcripts, classroom observations, and teacher journals, which confirmed that while most teachers perceived smartphones as

effective in promoting more dynamic and personalized language engagement, concerns over student distraction and unequal access remained prevalent. This analytical process not only deepened understanding of teachers' perceptions but also ensured methodological rigor.

4. Results

4.1. Research Question (RQ1): How Did Junior and Senior Students of Indonesia Improve Their English Skills Using Smartphones?

The result of this research covered data analysis about the students' perception of using smartphone-based applications to improve their English. The data was collected by conducting the survey and interviewing the participants. The survey was conducted on four hundred students from junior and senior schools in state and private schools. The questions need the answer "agree or very agree" to get information on how high the students' engagement in using smartphones to improve their English. The following figure shows that 42 % of students in state schools chose the answer "Agree" and 58% disagreed in response to the question "Do you use a smartphone to learn English?" Then 62% agreed and 38 % of students answered "disagree" with the question "Do you learn English with language apps such as Duolingo, BBC, and Hello Talk?" Meanwhile, the students mostly chose the answer "Agree" with 64% rather than "disagree" with 36% in responding to the question "Does learning English using a smartphone make it easier and more effective?". The last 53% answered "agree" and 47% of students preferred "disagree" in answering the question "Do you face any challenges in learning English using a smartphone?" as presented in **Figure 2** below:
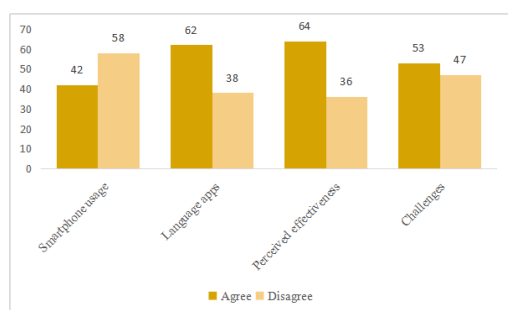
Figure 2. The Percentage of State School Students' Engagement in Using Smartphones to Improve Their English Language.

Compared to the results of state schools, the results of the survey of the students of private schools were quite different. **Figure 3** shows that 17 % of students in private schools chose the answer "Agree" and 83% disagreed in response to the question "Do you use a smartphone to learn English?" Then 16% agreed and 84% of students answered "disagree" with the question "Do you learn English with language apps such as Duolingo, BBC, and Hello Talk?" Meanwhile, the students mostly chose the answer "Agree" with 36% rather than "disagree" with 64% in responding to the question "Does learning English using a smartphone make it easier and more effective?". The last 8% answered "agree" and 92% of students preferred "disagree" in answering the question "Do you face any challenges in learning English using a smartphone?" as presented in **Figure 3** below:
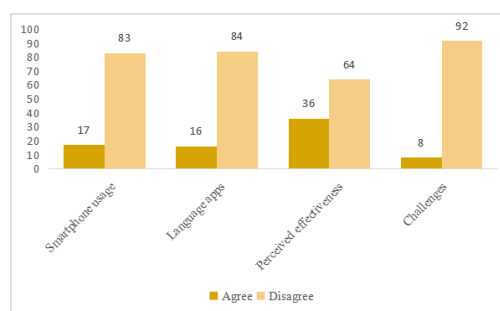
Figure 3. The Percentage of Private School Students' Engagement in Using Smartphones to Improve Their English.

4.2. Research Question (RQ2): How Did Teachers Perceive the Use of Smartphone-Based for Enhancing Students' Engagement in Learning English?

The selected respondents were teachers of state and private schools contacted by telephone for an interview. They were informed of the study's purpose, and the participants' convenience was considered while scheduling meetings with the interviewer. The interview was conducted in July 2023 using English communication and lasted between 10 and 20 minutes per each. However, a small number of the participants spoke both Indonesian and English. The researcher asked the teachers five questions. The overall purpose of the interviews was to discover external factors that influence students to use smartphones for learning.

The interview with state teachers reveals a variety strategy to motivate students to learn English using smartphones but this is not the case with private teachers who tend to be

more passive in motivating as stated by the state teachers:

I often use English learning applications both website-based and Android-based to take advantage of students' smartphones so that they are not only used for games and students are very happy about this (int_on_MR_ST).

On the other hand, teachers at private schools tend to take less advantage of opportunities to use smartphones and as stated by the following teacher:

I used the screen several times to show students material from YouTube and I conveyed that they also learn from YouTube with their smartphones (int_on_YLS_PT).

Following that, the state teachers not only applied game-based learning using smartphones but more than practicing it in the classroom and sometimes asking the students to do tasks at home using smartphones. A teacher of a state school states that:

I use Duolingo to train students to speak. Apart from Duolingo, I have used memrise to train students' vocabulary. This application helps students learn to improve their English skills, especially when studying independently at home (int_on_HR_ST).

In contrast, not all teachers at private schools know and are up to date with smartphone-based learning applications, so they don't even use them and don't recommend them to students as stated by one of the private school's teachers as follows:

I've heard that there is such an application, but I've never used it in learning English in class because the school doesn't facilitate an internet connection either (int_on_RAN_PT).

The result above implied that state teachers motivate students by giving suggestions and applying application-based learning through smartphones. This way could engage the students in increasing their English skills. In vice-versa the private teachers only support the students by giving suggestions to learn English using smartphones and very limited activities on smartphone-based learning done by the teachers. So, students tend to use their smartphones for gaming to learning. In addition, the result above implied that state teachers motivate students by providing suggestions and applying smartphone-based learning. This way could engage the students in increasing their English skills. In other words, private teachers only support students by giving suggestions for learning English using smartphones, and the teachers do

minimal activities on smartphone-based learning. So, students tend to use their smartphones for gaming to learning. The more the teachers apply smartphone-based learning the more the students skilled in using smartphones positively like doing their tasks through quizzes or Kahoot. On the other hand, the private students got less activity to engage them using smartphone-based learning. They only utilize it for communication through WhatsApp and finding word meanings. Finally, when the state teacher assists the students in applying smartphone-based learning, it could increase the student's motivation. furthermore, the school supports by providing free internet connection, while the limited wi-fi access reduces the private students to use smartphones for learning.

5. Discussion

The integration of smartphone applications into educational settings has revolutionized traditional learning methods, particularly in language acquisition. Firstly, this discussion delves into the perceptions of both students and teachers regarding the efficacy of these applications as well as disparities in access and resources in enhancing English language skills. Then, by examining the advantages and challenges highlighted by the participants, this section will discuss technological integration in teaching practices to enhance language learning experiences. Thirdly, a discussion on the impact on students' engagement and learning outcomes by using smartphone technology in reshaping language education will be drawn. Finally, recommendations for policy and practice, gathered from the data will offer valuable perspectives on the practical implications and future potential of using smartphone applications as a tool for English language improvement.

State school students frequently have access to more sophisticated materials and technology, such as mobile phones, which may be helpful learning aids for English. These educational institutions generally benefit from increased government financing and support, which makes it possible to use advanced, creative approaches to language instruction. On the other hand, there are certain obstacles that remote private schools must overcome, such as unreliable Wi-Fi and restricted smartphone availability. This discrepancy contributes to a digital gap that affects educational results by

making it more difficult for pupils to use language learning applications and online resources. It is crucial that rural private schools make comparable investments in instructional resources and offer each student an equal chance to succeed in order to close this achievement gap. Although smartphones have many educational advantages, Kortemeyer et al. point out that in order to effectively use their potential for teaching and learning English and transform the way educators teach and learn, it is imperative to overcome the issues they provide[12].

To make learning more dynamic and engaging, state school teachers frequently incorporate websites and apps such as Memrise, BBC Learning English, and Duolingo into their English instruction. By using gamification technologies, these teachers foster greater student engagement, critical thinking, and creativity. Quizzes and multimedia presentations help turn students' smartphones into effective educational tools, enhancing the overall learning experience. These practices align with findings that highlight the benefits of technology integration in language learning[13]. The growing use of websites, apps, and gamification in English language teaching is driven by several factors. These tools boost student motivation through interactive and engaging content, such as games, quizzes, and rewards, making learning more appealing. They also provide access to a wide range of resources beyond traditional textbooks, allowing for more diverse and rich language input[14, 15]. Digital platforms support various learning styles—visual, auditory, and kinesthetic—by offering multimedia and self-paced activities. With smartphones being widely accessible, teachers can transform them from potential distractions into effective educational tools. Additionally, increased teacher training and support in educational technology have made it easier to implement these methods. Research also confirms that such approaches enhance student engagement, retention, and language performance[13].

Learners agreed that using technology into English language learning made the classes enjoyable and motivating. This indicates that instructors are prepared to employ technology in the classroom. On the other hand, instructors in private schools frequently encounter limitations like not having access to the internet and being prohibited from using smartphones in class. Because of these restrictions, they encourage students to utilise smartphones for at-home study and depend more on conventional teaching techniques. The fact that different instructors have varying degrees of success with smartphone technology highlights the necessity of professional development and institutional support in order to optimise the advantages of digital learning tools. According to research[14, 15], in order to improve teaching performance through technology integration, educators and educational institutions must have a strategic plan in place.

Depending on the guidance and methods of their teachers, pupils' use of smartphone technology to improve their English differs greatly. Similar to the findings of Al-Sindi[15], teachers who actively use smartphone technology into their teaching techniques witness better levels of student engagement and improvements in English proficiency. By showcasing the educational advantages of smartphones and offering interactive resources like learning games and quizzes, these instructors inspire their pupils. Students often use smartphones more for suggestions and communication than for direct instruction in schools where free internet connection is scarce and smartphone-based learning is not as prevalent. This discrepancy emphasises how institutional support and instructional strategies affect students' capacity to participate in and gain from digital learning. Consistent with the results of previous studies[13, 16, 17], educators who actively integrate smartphone technology into their lesson plans see increased student involvement and English proficiency growth. In order to successfully integrate technology into language classrooms, teachers must continuously improve their methods. This is because old technology may not pique students' attention or satisfy current learning objectives, which might lead to disengagement. It is important to acknowledge that technology may yield both favourable and unfavourable outcomes for education[18, 19]. Therefore, intelligent integration and balanced usage of technology are crucial.

Ensuring fair access to resources and technology is critical to closing the achievement gap between public and private schools. Policymakers have to think about sponsoring and assisting private schools in remote areas that want to upgrade their internet access and use cutting-edge teaching resources[20]. Furthermore, teacher professional development programs can improve their capacity to successfully incorporate smartphone technology into their instructional strategies. Teachers may assist in closing the achievement gap between private and public schools by emphasizing students' access

to technology, resources, and cutting-edge teaching techniques. This will guarantee that every student has the chance to succeed in language acquisition.

6. Conclusions

The implications from these study findings are very beneficial for practicing English class variety learning. The results indicated that four hundred students of junior and senior schools have smartphones, but not all of them use them to learn English. Students from state schools have more engagement in applying smartphones in learning English compared to private ones. It was proven by the percentage of 4 aspects of questions that the researchers created. About 84% of students use smartphone-based learning to improve their English skills. Meanwhile, only 16% of students do not use smartphones for learning English. The student's willingness to apply smartphones to learn English is influenced by internal engagement and supported by teachers, family, and the environment as the external engagement. The teachers of state schools support the students to learn English using smartphones by providing several resources and applications to be learned at school and as supplementary material at home. In contrast, private school students are dominated by self-awareness and internal engagement to find English resources to learn.

Overall, the use of smartphones for learning English differs significantly between state and private schools. State schools often have the resources and support needed to integrate smartphones into their teaching methods effectively, providing students with a more immersive and engaging language learning experience. In contrast, private schools face challenges that limit their ability to utilize smartphone technology fully. Addressing these disparities is essential for promoting educational equity and ensuring that all students can benefit from the advantages of digital learning tools. By investing in technology and professional development, educators can create a more inclusive and effective learning environment for all students. From distraction to dedication, the strategic use of smartphones can transform the learning environment, enhancing student engagement and language acquisition when being applied thoughtfully and supported by adequate resources.

Author Contributions

Conceptualization was carried out by D.I.H.; methodology was developed by H.P.S.; software was designed and implemented by E.I.; validation was performed by D.I.H. and H.P.S.; formal analysis was conducted by D.I.H.; investigation was undertaken by H.P.S.; resources were provided by D.I.H.; data curation was handled by D.I.H. and H.P.S. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The author declares no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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