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# Indonesian pre-service students' preferences, frequencies, and perceptions of using mobile devices in language learning across departments and genders

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**Abstract**

University students worldwide use mobile devices for language learning, but little is known about how mobile devices relate to Indonesian pre-service students across departments and genders. This study examined Indonesian pre-service students' preferences, frequencies, and perceptions of how English Education and Mathematic Education departments use mobile devices for language learning across departments and genders. The participants in this study were first-year to seventh-year pre-service students from two departments at a public university in Banten province. The samples were three hundred and two pre-service students who studied English as a foreign language at an Indonesian public university in Banten province, including 246 females (150 from English Education and 96 from Mathematics Education) and 56 males (42 from English and 14 from Mathematics). The study utilized a quantitative research design, employing an online survey with a closed-ended questionnaire as the primary instrument for data collection. The researchers then categorized and interpreted the survey data descriptively and quantitatively to answer the study's questions. The study found that most female students from both departments use smartphones almost daily, followed by laptops, and they positively perceive using mobile devices in learning languages. Due to cost, spare parts, and data sharing, the students from both departments rarely use other mobile devices such as iPads, tablets, smartwatches, and Google Glass. Next, this study demonstrated the benefits of learning environments, including how pre-service students use mobile devices to learn English as a foreign language, more technical support for using technologies in ELT settings, and the impact on language teaching.

**Keywords:** Departments, gender, language learning, mobile devices, pre-service students

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## INTRODUCTION

The transformative role of technology in language learning focuses on its ability to improve interactivity and resource access. The advancements highlight technology's transformative potential for closing gaps in traditional language learning environments (Haleem et al., 2022; Su & Zou, 2022; Zhang & Zou, 2022.). Studies have shown that digital tools, such as mobile devices, language learning apps, and online platforms, significantly increase learner engagement and motivation (Khasawneh & Khasawneh, 2023; Lai et al., 2022; Metruk, 2022; Sad et al., 2020). Technology, like mobile devices, makes learning flexible and personalized to provide diverse learners(Criollo-C et al., 2021; Gumbheer et al., 2022; Whalley et al., 2021). In summary, mobile devices, as one of the technological advancements, have significantly impacted the effectiveness and accessibility of language learning for learners.

Mobile devices are portable and versatile, offering a variety of functionalities beyond communication. Some studies have shown that mobile devices such as laptops, tablets, and smartphones are characterized by their user-friendly interfaces, connectivity, and accessibility,

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making them useful in various situations (Khan et al., 2022; Sabado, 2024; Stasberger, 2023). Then, mobile device adoption is driven by their ability to support various applications and provide instant access to information (Alghazi et al., 2021; Hoi & Mu, 2021; Mohtar et al., 2023). As a result, mobile devices have become an essential part of everyday activities, including learning.

In the context of language learning, mobile devices have significant benefits in improving learner engagement. Then, language learning from mobile devices provides interactive, enhancing learning enjoyment and effectiveness (Gutiérrez-Colón et al., 2023; Xodabande & Hashemi, 2023; Yu et al., 2023). Moreover, mobile devices enable personalized learning by allowing students to study at their own pace and according to their needs (Hashim et al., 2022; Kessler et al., 2023; Schmid et al., 2023). Accessing learning materials at any time and from any location improves the versatility and consistency of language practice. As a result, people are increasingly seeing mobile devices as valuable tools for language learning and practice (Bradley et al., 2023); (Jeanjaroonsri, 2023); (Kukulska-Hulme et al., 2023). Mobile devices allow students to access learning materials anytime, anywhere, improving language practice versatility and becoming popular language learning and practice tools.

Numerous students carry mobile devices daily; it is highly anticipated that LE mobile devices will enhance students' L2 2 (Aguilar, 2018). In addition to the benefits of mobile devices as a technology, they hold great promise for collecting trace data (i.e., digital records that students produce when they use learning technology features) (Bernacki & Walkington, 2018). Therefore, a mobile device is an excellent opportunity to improve the quality and effectiveness of learning English (Siricord & Yunus, 2018) available for distance-learning students (Hulme, 2019). It can also be used as learning material (Liu & Chiu-Jung, 2015). In conclusion, related technology-enhanced learning, particularly mobile devices, benefits education and has shown the advantages of using mobile devices for learning.

Mobile devices can be used as a self-access learning center to promote the independent study, resource selection, and spoken English communication inside and outside the classroom. It should be emphasized that practicing English directly and positively impacts learning performance (Hwang & Chen, 2013). In line with the explanation above, the students should share their ideas, opinions, and information to interact with other students related to the materials.

Language learning and practice performance have already received much attention. Hwang and Chen (2013) stated that the more students practice English, the better their skills, particularly foreign-language those who speak English. The more time and effort learners put into speaking and listening, the better their EFL skills. Mobile devices for listening and speaking allow students to hear a single student's speech and the speaking styles of multiple learners (such as learning performance level, accent, and fluency).

The mobile device is personalized and spontaneous. One trend involves researching mobile devices' effects on L2 outside of class, particularly for EFL students practicing autonomous L2 (Liakin, Cardoso & Liakina, 2017). Customized learning is crucial to modern learning and assessment because each person is unique and should be taught/learned differently. Previous studies have primarily determined mobile devices' potential to assist language learning (Huang & Chiu, 2015) and employ mobile devices in their classes (Liang & Huang, 2014). Mobile devices' effects on L2 outside classroom settings, particularly for EFL students, autonomous L2 learning, and customized learning are crucial to modern learning and assessment because each person is unique and should be taught/learned differently.

In recent years, mobile devices have become increasingly popular in Indonesian ELT settings to improve language learning. Mobile devices are highly efficient in offering adaptable and easily accessible learning opportunities for students (Arung Arafah et al., 2024; Hidayat et al., 2022; Serevina et al., 2022). Some studies suggest that mobile applications and platforms enhance language proficiency by providing interactive and tailored learning opportunities (Amalia, 2023; Hasibuan, 2023; Purbohadi et al., 2023). In addition, the extensive utilization of smartphones has facilitated more regular practice and involvement beyond the confines of the classroom (Ajijah et al., 2024); (Rahman et al., 2023). Mobile devices have improved language learning in Indonesia and are becoming more popular in ELT settings because they are adaptable and easily accessible for students.

However, by contrast, researchers debated the advantages of mobile devices in ELT settings. Other researches identify drawbacks such as potential distractions, over-reliance on technology, and unequal student access (Almadhun et al., 2023; (Wulandari et al., 2023). Next, critics argue that mobile devices can impede deep learning and face-to-face interaction, which are necessary for language acquisition (Almusaed et al., 2023; Childs & Holland, 2024; Elias et al., 2021). Then, the researchers lamented the failure to propose a pedagogical design suited to mobile devices anytime, anywhere affordances (Azionya & Nhedzi, 2021; Oon et al., 2023; Rockey et al., 2023). Mobile device use for language learning is also limited by technical support, school culture, teachers' personal beliefs, and facility availability (Alghazi et al., 2021; Elias et al., 2021; Sung, Chang & Liu, 2016). In sum, mobile devices can hinder deep learning and face-to-face interaction, which are necessary for language acquisition, due to facility availability, technical support, and unequal student access.

Therefore, informed by inconclusive findings, the study investigates Indonesian pre-service students' preferences, frequencies, and perceptions of using mobile devices in language learning across departments and genders. The researchers want to know the practical applications of mobile devices and how Indonesian EFL students use them for language learning across departments and genders. This study's specific goals are (1) to determine the Indonesian pre-service students' preferred mobile devices for language learning across departments and genders, (2) to determine how often Indonesian pre-service students use mobile devices for language learning across departments and genders, and (3) to determine how Indonesian pre-service students, across departments and genders, respond to mobile devices for language learning.

**Mobile device**

Nowadays, mobile devices are popular among educators, particularly in higher education. Since many students were involved in the fun and collaborative lesson, the ease of receiving information and the fact that the learners already knew how to work with technology were seen as the main benefits (Hoi & Mu, 2021; Jeong, 2022; Nikolopoulou, 2020). Also. since many people have mobile devices with internet access, computer-based learning is giving way to mobile-assisted learning (Rozitis, 2017). It provides portable personal knowledge inside and outside the classroom (Dobbins & Denton, 2017). Mobile learning devices can support academic learning anytime and anywhere, enable micro-learning as opportunities arise, and provide personalized monitoring and advice (Mayer, 2020). In sum, students enjoyed the fun and collaborative lesson, and mobile devices were made worthwhile for academic learning anytime and anywhere, along with personalized monitoring and technology skill advice.

Innovations in modern technology are altering anything and everything, including education. In the form of technology, mobile devices help language learners access resources, practice skills, and communicate with native speakers (Stockwell, 2021; Zain & Bowles, 2021). Moreover, mobile devices can improve the learner's listening, speaking, reading, and writing skills. Next, language learners can use smartphones, laptops, and tablets to enhance teaching and learning (Alshahrani, 2016; Le, 2021; Metruk, 2022; Solihin, 2021). Therefore, the students can practice outside class, making them independent learners. Moreover, researchers and educators believe mobile devices can improve learning due to their accessibility (Chen, 2022; Habib et al., 2022; Jie & Sunze, 2023) and how they affect independent language learning outside the classroom. (Lei et al., 2022; Liakin, Cardoso & Liakina, 2017; Pratiwi & Waluyo, 2023). In conclusion, mobile devices are easily accessible, allowing language learners to practice, access resources, and communicate with native speakers, and researchers and educators believe they can improve L2 learning.

As explained earlier, mobile devices can reduce adverse effects on students and boost positive effects, facilitating learning (Eom, 2023; Rocque, 2022; Togaibayeva et al., 2022). In addition, the students enjoyed using technology, which was correlated with learning success (Harley, Liu, Ahn, et al., 2019; Hsbollah & Hassan, 2022; Lin, 2022). In sum, mobile devices can reduce adverse effects on students while increasing positive effects, facilitating learning. Students enjoyed using technology, which was correlated with academic success.

**Type of mobile device**

Mobile devices, including smartphones, laptops, tablets, and wearables, may enhance learning efficiency (Mayer, 2020). Smartphones are cutting-edge devices that improve students' teaching and learning experiences in English as a foreign language. (Metruk, 2022). Metruk adds that students can benefit significantly from smart devices due to their portability and 24-hour availability. Then, smartphone-based English learning allows for 'anytime' and 'anywhere' learning, seamless social, formal, and informal education, and integration of personal (Luo & Watts, 2022).

In summary, several mobile devices can contribute to the progress of education, including smartphones, laptops, tablets, and even wearable technology. In the form of smartphones are advanced instruments that enhance EFL classroom teaching and student achievement. Students can significantly profit from smart devices due to their constant availability and portability of learning at any time and place and the integration of formal, informal, social, personal, and mobile learning.

With the advancement of technology, laptops are now standard in educational settings, particularly colleges. Laptops became popular among students due to their efficiency in recording and organizing notes, and students' academic performance increased with their self-perceived technology adoption, challenging traditional methods (Smith et al., 2022). Smith et al. add that there was also a significant positive relationship between participants' belief that they had adequate professional development for using laptops in instruction and learning and their belief that laptops helped students improve their work. The following section pertains to the utilization of laptops in language acquisition; the accessibility with which learners use them is also an essential factor (Voyer et al., 2022). Moreover, the utilization of laptops in classrooms enhanced the provision of feedback for team assignments (Deveci et al., 2018). Deveci et al. add that incorporating laptops enhanced classroom management and syllabus delivery, according to instructors. In sum, technology has made laptops common in educational settings, particularly colleges, and students love them for their efficiency in recording and organizing notes, improved academic performance, and accessibility.

**The use of mobile devices for students' activities in language learning**

Technology-enhanced language learning has created more connected and collaborative language learning environments as information and communication technology has grown. Then, due to the popularity of smartphones, mobile-assisted language learning (mobile devices) helps students learn languages (Jeong, 2022). Next, mobile devices bring authentic learning experiences to students, making it easier to adapt to new learning experiences (Bernacki et al., 2020; Cheung et al., 2021; Criollo-C et al., 2021). In sum, for sustainable self-directed learning, technology-enhanced mobile devices are necessary.

Mobile devices allow students to learn, collaborate, and share ideas. Learning language through mobile devices enables learners to have their learning process wherever and whenever (Huang, Yang, Chiang, et al., 2016). In language learning, the mobile device supports personalized, ubiquitous, efficient, usable, and flexible learning based on learners' ability to use easy-going devices to improve teaching-learning. Moreover, educational institutions should use mobile devices to keep up with digital learning, and each device should be researched (Solihin, 2021). Therefore, students should use many mobile devices to make the activities challenging and exciting, particularly in learning languages. Thus, mobile devices give students unique opportunities to use effective cognitive strategies in formal and informal contexts, but they must learn how to do so to benefit. In sum, this study answered the research questions about Indonesian pre-service students' preferences, the frequencies, and how students respond to using mobile devices for their language learning across departments and genders.

## METHOD

The study utilized a quantitative research design, utilizing a survey as the main instrument for data collection. The survey was designed to be completed online to distribute quickly to respondents, provide them convenience, and conceal their identities (Lawlor et al., 2021). Lawlor et al. add that this study chose the survey as its primary technique due to its convenience, timeliness, and low cost for

researchers and respondents. Furthermore, web-based questionnaires offer many other valuable features than paper-based questionnaires. This study aims to identify pre-service students' preferences, frequencies, and perceptions of using mobile devices across departments and genders.

**Participants**

The study's participants were from a population of the Faculty of Teacher Training and enrolled from two departments in a public higher education university in Banten province, Indonesia. Students volunteered to answer the anonymous online survey after receiving a digital information letter and consent form on the homepage. We selected the sample using causal, non-probabilistic sampling, with easy accessibility being the main acceptance criterion. Then, the samples were selected from students in one of two academic programs with internet-connected mobile devices.

In this study, from February to April 2023, we surveyed 720 English Education and Mathematics students and received 302 responses. Then, the students were from different semesters majoring in the English and Mathematic education department in an even semester, attending one of the public universities in Indonesia, and every class consists of 40- 43 students (18 to 20 years old). In this study, three hundred and two undergraduate students from two departments from the even semesters participated in a public university in Banten province, Indonesia. There were 246 or (81.5%) female students, consisting of 150 (49 %) from English Education and 96 (32%) from the Mathematics Education department. On the other hand, 56 or (18.54%) male students, consisting of 42 (14%) male students from the English Education Department and 14 (5%) male students from the Mathematics Education Department.

Next, related to the academics of the samples, they were spread across different years of study, including the first years were 91 students (30.1 %), second were 121 students (40.1%), third was 41 students (13.6%), fourth was 38 students (12.6%), and the rest from the fifth was seven students (2.3%), the sixth was none (0%), and seventh were four students (1.3%). Most samples were female students, and 264 or 81.5% of all responses were from both departments. Moreover, the reason for involving the students is that the researcher serves as one of the teaching staff in this faculty. Therefore, it was easier for the researchers to get access to the students when distributing the closed-ended questionnaire.

**Research instrument**

The primary instrument used to collect the data was an online survey questionnaire. The students voluntarily took part in the study to respond to the questions contained in the closed-ended questionnaire that served as the instrument. The researchers collected data and answered questions by employing a survey questionnaire. The expert validation examined the instrument's validity and suggested modifications to the researchers. The expert review suggested spelling corrections, reorganizing long lists, and adding more mobile app examples. The researchers modified a previous study's questionnaire for reliability. Twenty-five items assessed department and gender preferences, frequencies, and perceptions of mobile language learning (Hoang et al., 2022).

**Data collection method**

The method of data collection used in this study was the closed-ended questionnaire approach. In this study, the survey had three parts. It also consists of 20 questions to answer three research questions. The first section collected demographic information from Indonesian pre-service students across departments and genders. The following topic addressed mobile device ownership, access, and frequency of use among Indonesian pre-service students from various departments and genders. The third section examined Indonesian pre-service students' attitudes toward using mobile devices for language learning across departments and genders. Furthermore, the primary goal of this questionnaire is to investigate Indonesian pre-service students' preferences, frequency, and perceptions of using mobile device applications to learn English across departments and genders.

In this study, the researcher classified them based on department and gender and presented the data in the diagram related to data analysis of EFL students' mobile device application preferences. Also, the researcher inferred data from a closed-ended questionnaire to clarify research questions 2

and 3 about the frequencies and students' perceptions of using mobile devices for language learning across departments and genders. The researchers used the participants' responses as a questionnaire to answer the research questions that serve as the foundation for this study. Nevertheless, the researcher did not employ any distinctive coding techniques. Conversely, the researchers meticulously chose the participants' statements based on their pertinence and engagement in bolstering the descriptive findings.

**Data analysis**

Google Forms questionnaires collected data for the analysis. Fill in the items. After students completed the questionnaire, descriptive statistics were used to analyze the mean and median to understand their perspectives. Standard deviation measured variability, while mean measured central tendency. The central tendency and variability measures will show the data's average and distribution.

Furthermore, the researchers used labels to alter the variables during analysis and used descriptive statistics for each variable in the survey. Crosstabulations revealed data trends and rating scales for how much people agreed or disagreed (Cohen et al., 2011). Then, the closed-ended questions, categories, and subcategories of mobile device preferences were organized, labeled, and quantified after cleaning up. In sum, the researchers categorized and interpreted the data descriptively and quantitatively regarding the study's questions about preferences, frequencies, and students' responses to mobile devices for language learning across departments and genders.

## FINDINGS

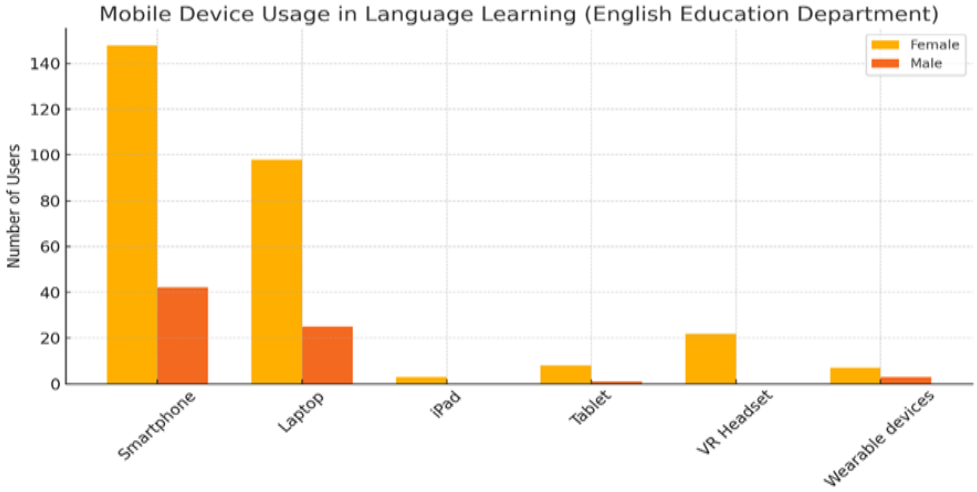
This study examined the preferences, frequencies, and perceptions of using mobile devices for language learning among Indonesian pre-service students across departments and genders. It also attempts to determine significant differences between students from the English Education Department and Mathematics Education Department and gender. The answers to the research questions are discussed in the following sections.

### Indonesian pre-services students' preferences of using mobile devices for language learning across departments and genders

This study examined how Indonesian pre-service students utilize mobile devices for language learning, specifically investigating their preferences, frequencies, and perceptions across genders and departments. To address the first research question about the students' preferences for using mobile devices in language learning across departments and genders, as shown in Figure 1, the highest ownership was the smartphone, followed by a laptop from the English Education Department. Most female students preferred smartphones (148 students, 49.01%) and laptops (98 students, 32.45%). Also, it shows that accounting for 42 male students (13.90%) of their usage for smartphones and laptops were the second most favored devices, with a usage rate of 25 students (8.28%). Most female and male English department students preferred smartphones and laptop computers.

**Figure 1**

*Students' Mobile Devices Ownership from English Education Departments*




Following that, as seen in Table 1 within the English Education Department, the majority of female students utilized smartphones (148 students or 49.01%) and laptops (98 students or 32.45%), students used VR headsets (22, or 7.28%), tablets (8, or 2.65%), wearable devices (7, or 2.32%), and iPads (3, or 0.99%) less frequently. Meanwhile, smartphones were the most preferred mobile devices among the male students in the English Education department. Then, it shows that accounting for 42 students (13.90%) of their usage for smartphones. Laptops were the second most favored devices, with a usage rate of 25 students (8.28%). However, their overall usage of mobile devices was considerably lower. Tablets were barely used, accounting for only one student (0.33%) of their usage, while wearable devices were used slightly more, with a usage rate of 3 students (0.99%). However, the male students had no reported instances of iPad or VR headset usage. In sum, female English Education Department students access the same mobile devices as male students in the form of smartphones and laptops.

**Table 1**

*Female and Male Students' Mobile Devices Ownership from the English Education Department*

| Item | Female | | Male | |
|---|---|---|---|---|
| | N | Percentage | N | Percentage |
| Smartphone | 148 | 49.01% | 42 | 13.90 % |
| Laptop | 98 | 32.45% | 25 | 8.28 % |
| iPad | 3 | 0.99 % | 0 | 0% |
| Tablet | 8 | 2.65 % | 1 | 0.33% |
| Virtual Reality (VR) Headset | 22 | 7.28 % | 0 | 0% |
| Wearable devices (e.g., Google Glass, smartwatch) | 7 | 2.32 % | 3 | 0.99 % |

In this study, a survey conducted in the Mathematics Education Department demonstrated that female and male students have different preferences regarding the use of mobile devices. Then, according to the data, female students in the Mathematics Education Department make greater use of mobile devices than their male counterparts in the form of laptop computers and smartphones. The smartphone had the highest ownership, followed by a laptop from the Mathematics Education Department. Most female students preferred smartphones (93, 30.79%) and laptops (88, 29.13%). It also shows that smartphones accounted for 15 male students (4.96%) of their usage, while laptops were the second most popular device, with 11 students (3.46%). In sum, the smartphone had the highest ownership rate, followed by a laptop, and there is a significant gender gap in the adoption and utilization of various mobile technologies within this academic setting from the Mathematical Education Department.

Afterward, as shown in Table 2 from this study, most female students (93 students or 30.79%) and laptops (88 students or 29.13%) preferred smartphones. The use of iPads (1 student or 0.33%), tablets (2 students or 0.66%), VR headsets (10 students or 3.31%), and wearable devices (4 students or 1.32%) was limited.

**Table 2**
*Male and Female Students' Mobile Devices Ownership from Mathematic Education Department*

| Item | Female | | Male | |
|---|---|---|---|---|
| | N | Percentage | N | Percentage |
| Smartphone | 93 | 30.79% | 15 | 4.96% |
| Laptop | 88 | 29.13% | 11 | 3.46% |
| iPad | 1 | 0.33 % | 0 | 0 % |
| Tablet | 2 | 0.66 % | 1 | 0.33 % |
| Virtual Reality (VR) Headset | 10 | 3.31 % | 0 | 0 % |
| Wearable devices (e.g., Google Glass, smartwatch) | 4 | 1.32 % | 0 | 0 % |

In contrast, male students primarily utilized smartphones (15 students or 4.96%) and laptops (11 students or 3.64%), with very little use of other devices such as tablets (1 student or 0.33%), and no use of iPads, VR headsets, or wearables.. In sum, female students in the English Education Department had access to the same mobile devices as male students, particularly laptops and smartphones.

**Indonesian pre-service students' frequencies of using mobile devices for language learning across departments and genders**

The second research question examines Indonesian pre-service students' frequency of using mobile devices for language learning across departments and genders. In this study, male and female Indonesian pre-service students in the English education department showed significant differences in their frequencies of using mobile devices for language learning, as shown in Figure 3. Female students used smartphones almost every day, accounting for 144 students (96%) of total usage, followed by 61 students who used laptops (40.7%). On the other hand, female students used iPads and tablets sparingly, with average daily usage rates of 1 student (0.7%) and three students (2%), respectively. Ten female students used VR/headsets, and six female students used wearable devices at relatively low rates (6.7% and 4%, respectively).

Unlike their female counterparts, male students from the English education Department reported almost no use of iPads or tablets, with rates of 0% for both. VR/headsets and wearable devices were underutilized, with nearly daily usage rates of 1 student (2.4%) in each category. The data show that male and female students in the English education department rely heavily on smartphones and laptop computers for language learning. The study results show that Indonesian pre-service from English education students use smartphones and laptops for language learning almost daily, with gender differences in using other mobile devices.

Figure 4 shows that male and female Indonesian pre-service students in the mathematics education department used mobile devices for language learning at significantly different rates. Males and females in the mathematics education department used mobile devices differently. Female students used smartphones almost every day, accounting for 84 students (87.5%) of total usage, followed by laptops by 53 students (55.2%). Other devices, such as iPads and tablets, were used almost daily by the 0 students, with rates of 0% for both. Similarly, VR/headset and wearable device usage rates were low, by seven students (7.3%) and four students (4.2%), respectively. Twelve male students also preferred smartphones, using them almost daily at 85.7%. Laptops were the second most popular device among nine male students, with 64.3% reporting near-daily use.

**Figure 3**
*Students' Frequencies of Using Mobile Devices from English Education Departments*

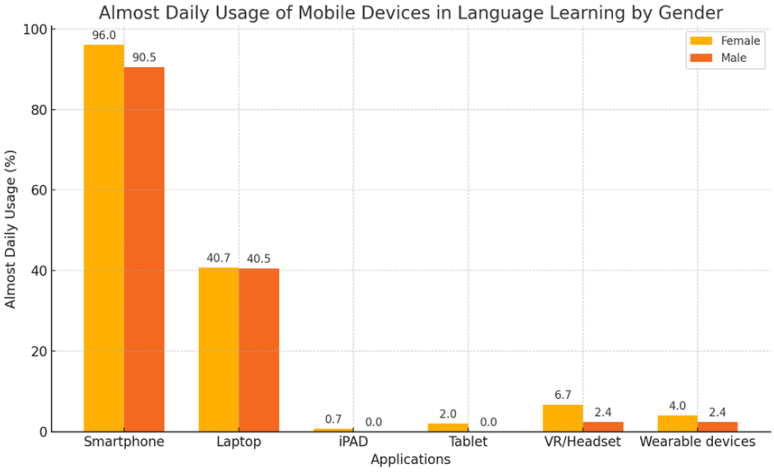
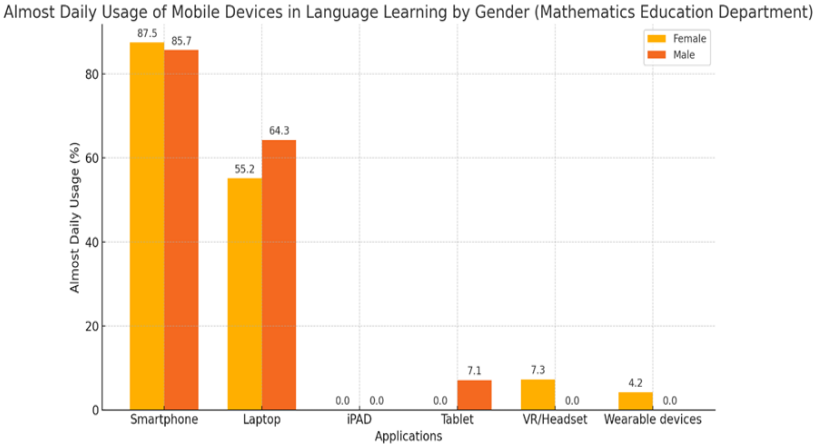



**Figure 4**

*Students' Frequencies of Using Mobile Devices from Mathematics Education Departments*




In contrast, iPads were not used by any student, and tablet usage was minimal by one student, with a 7.1% daily usage rate. Male students did not report using VR/headsets or wearable devices daily. Overall, the data show that male and female students in the Mathematics Education department rely heavily on smartphones and laptops for language learning. In sum, smartphones and laptops are the primary tools for language learning among Mathematics education students, with little use of other mobile devices.

On the other hand, male students had a similar preference for smartphones, with 90.5% reporting frequent use. Laptops were the second most popular device, with 17 male students (40.5%) using them almost daily. In summary, male and female students in the Mathematics Education Department use mobile devices, such as smartphones and laptop computers, almost daily for language learning.

**Indonesian pre-service students' perceptions of using mobile devices for language learning across departments and genders**

This study's third research question is about pre-service students' perceptions of using mobile devices for language learning across departments and genders. The female student's responses from the English education Department strongly agree that the questionnaire results show a positive appreciation for using mobile devices for language learning across departments and genders. Eight statements had the highest scores: 1, 2, 4, 5, 6, 7, 8, and 9. To be more specific, statement 1 says that I can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning, accepted by 98.7% of students. Next, statement 2 states that the students can download language-learning apps by 98.7%. Then, statement 4 shows that the student wants to learn languages on mobile devices, with its highest score of 99.3%. After that, statement 5 shows that mobile devices are essential for language practice, with a score of 97.3%. Statement 6

proves that learning a foreign language on mobile devices is motivating, with a score of 98.7%. This is followed by statement 7, which states that flexible mobile devices let the student study anywhere and anytime, with a score of 98%.

Moreover, in statement 8, mobile devices help the students learn languages with a score of 99.3%. Finally, statement 9 shows that mobile devices help me learn useful 21st-century skills like communication, collaboration, creativity, critical thinking, and ICT, with a score of 98%. However, statement fourteen, with a score of 54.7% of female students from the English Education Department, also said that campus internet should be fast and reliable for mobile devices, as revealed in Table 3.

**Table 3**

*Female Students' Perceptions from the English Education Department*

| Items | SA | A | N | D | SD | Med. | M | SD |
|---|---|---|---|---|---|---|---|---|
| I can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning. | 98.7% | 0% | 0% | 0% | 1.3% | 4.00 | 3.96 | 0.345 |
| I can download language-learning apps. | 98.7% | 0% | 0% | 0% | 1.3% | 4.00 | 3.96 | 0.345 |
| I can customize language learning apps (e.g., settings or self-learning activities). | 90.7% | 0% | 0% | 0% | 9.3 | 4.00 | 3.72 | 0.875 |
| I want to learn languages on mobile devices. | 99.3% | 0% | 0% | 0% | 0.7% | 4.00 | 3.98 | 0.244 |
| Mobile devices are essential for language practice. | 97.3% | 0% | 0% | 0% | 2.7% | 4.00 | 3.92 | 0.484 |
| Learning a foreign language on mobile devices is motivating. | 98.7% | 0% | 0% | 0% | 1.3% | 4.00 | 3.96 | 0.345 |
| Mobile devices are flexible and allow me to study anywhere, anytime. | 98% | 0% | 0% | 0% | 2% | 4.00 | 3.94 | 0.421 |
| Mobile devices help me learn languages. | 99.3% | 0% | 0% | 0% | 0.7% | 4.00 | 3.98 | 0.244 |
| Mobile devices help me learn useful 21st-century skills like communication, collaboration, creativity, critical thinking, and ICT. | 98% | 0% | 0% | 0% | 2.% | 4.00 | 3.94 | 0.421 |
| I learn languages more actively with mobile devices. | 96.7% | 0% | 0% | 0% | 3.3% | 4.00 | 3.90 | 0.540 |
| Mobile devices enable real-life language learning. | 93.3% | 0% | 0% | 0% | 6.7% | 4.00 | 3.80 | 0.750 |
| Upgrade my mobile device(s). | 85.3% | 0% | 0% | 0% | 14.7% | 4.00 | 3.56 | 1.064 |
| My campus has enough mobile learning devices. | 76% | 0% | 0% | 0% | 24% | 4.00 | 3.28 | 1.285 |
| Campus Internet is fast and reliable for mobile devices. | 54.7% | 0% | 0% | 0% | 45.3% | 4.00 | 2.64 | 1.498 |
| My IT team provides fast, online, and help-desk support. | 82.7% | 0% | 0% | 0% | 17.3% | 4.00 | 3.48 | 1.139 |
| My teachers recommend using mobile devices for language learning in class. | 94.7% | 0% | 0% | 0% | 5.3% | 4.00 | 3.84 | 0.676 |
| My teachers recommend using mobile devices for language learning after class. | 96.7% | 0% | 0% | 0% | 3.3% | 4.00 | 3.90 | 0.540 |
| Peers encourage me to use mobile devices for language learning. | 94.7% | 0% | 0% | 0% | 5.3% | 4.00 | 3.84 | 0.676 |

**SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; Med. = Median; M= Mean; SD = Standard Deviation**

Then, the result of the analysis of female Indonesian pre-service students using mobile devices for language learning across departments and genders. The female students from the English Education Department learn languages on mobile devices (M=3.98). The students believed mobile devices help them learn languages (M= 3.98), and how to use in-built functions of mobile devices for language learning purposes, download language learning apps, and learn a foreign language on mobile devices is motivating for them (M=3.96). However, campus internet should be fast and reliable for mobile devices (M=2.64).

Male student responses from the English Education Department strongly agree that the questionnaire results show a positive appreciation for using mobile devices for language learning across departments and genders. Six statements received the highest scores: 1, 4, 5, 6, 7 and 8. Specifically, in first statement 1, they can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning, chosen by 97.6 % of students. Then, statement 4 shows learning languages on mobile devices, with its highest score of 100 %. After that, statement 5 shows that mobile devices are essential for language practice, with a score of 97.6 %. Statement 6 proves that learning a foreign language on mobile devices is motivating, with a score of 97.6 %. This is followed by statement 7, which states that the flexibility of mobile devices lets them study anywhere and anytime, with a score of 97.6 %. Finally, in statement 8, mobile devices help them learn languages, with its highest score of 100 %, as shown in Table 4.

**Table 4**

*Male Students' Perceptions from the English Education Department*

| Items | SA | A | N | D | SD | Med. | M | SD |
|---|---|---|---|---|---|---|---|---|
| I can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning. | 97.6% | 0% | 0% | 0% | 2.4% | 4.00 | 3.92 | 0.462 |
| I can download language-learning apps. | 95.2% | 0% | 0% | 0% | 4.8% | 4.00 | 3.85 | 0.646 |
| I can customize language learning apps (e.g., settings or self-learning activities). | 88.1% | 0% | 0% | 0% | 11.9% | 4.00 | 3.64 | 0.983 |
| I want to learn languages on mobile devices. | 100% | 0% | 0% | 0% | 0% | 4.00 | 4.00 | 0.000 |
| Mobile devices are essential for language practice. | 97.6% | 0% | 0% | 0% | 2.4% | 4.00 | 3.92 | 0.462 |
| Learning a foreign language on mobile devices is motivating. | 97.6% | 0% | 0% | 0% | 2.4% | 4.00 | 3.92 | 0.462 |
| Mobile devices are flexible and allow me to study anywhere, anytime. | 97.6% | 0% | 0% | 0% | 2.4% | 4.00 | 3.92 | 0.462 |
| Mobile devices help me learn languages. | 100% | 0% | 0% | 0% | 0% | 4.00 | 4.00 | 0.000 |
| Mobile devices help me learn useful 21st-century skills like communication, collaboration, creativity, critical thinking, and ICT. | 90.5% | 0% | 0% | 0% | 9.5% | 4.00 | 3.71 | 0.891 |
| I learn languages more actively with mobile devices. | 95.2% | 0% | 0% | 0% | 4.8% | 4.00 | 3.85 | 0.646 |
| Mobile devices enable real-life language learning. | 81% | 0% | 0% | 0% | 19% | 4.00 | 3.42 | 1.192 |
| Upgrade my mobile device(s). | 73.8% % | 0% | 0% | 0% | 26.2% | 4.00 | 3.21 | 1.335 |
| My campus has enough mobile learning devices. | 78.6% | 0% | 0% | 0% | 21.4% | 4.00 | 3.35 | 1.245 |
| Campus Internet is fast and reliable for | 52.4% | 0% | 0% | 0% | 47.6% | 4.00 | 2.57 | 1.516 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| mobile devices. | | | | | | | | |
| My IT team provides fast, online, and help-desk support. | 76.2% | 0% | 0% | 0% | 23.8% | 4.00 | 3.28 | 1.293 |
| My teachers recommend using mobile devices for language learning in class. | 95.2% | 0% | 0% | 0% | 4.8% | 4.00 | 3.85 | 0.646 |
| My teachers recommend using mobile devices for language learning after class. | 92.9% | 0% | 0% | 0% | 7.1% | 4.00 | 3.78 | 0.781 |
| Peers encourage me to use mobile devices for language learning. | 95.2% | 0% | 0% | 0% | 4.8% | 4.00 | 3.85 | 0.646 |

**SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; Med. = Median; M= Mean; SD = Standard Deviation**

The results of the analysis of male Indonesian pre-service students using mobile devices for language learning across departments and genders. They can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning (M=3.92). The male students were interested in using mobile devices in language learning (M=4.00). The students learn the language on mobile devices, giving them motivation and flexibility to study anywhere, anytime (M= 3.92). However, it is related to upgrading their mobile device(s) (M= 3.21). Also, the campus internet is fast and reliable for mobile devices (M= 2.57).

In this study, Indonesian Mathematics Education Department pre-service students are familiar with and positive about using mobile devices for language learning. Female student responses from the Mathematics Education Department strongly agree that the questionnaire results show a positive appreciation for using mobile devices for language learning across departments and genders. Six statements received the highest marks: 1, 4, 5, 7, 8, and 10. Specifically, the first statement from questionnaire number one was that 95.8% of female students strongly agree that they can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning. Then, statement 4 shows how to learn languages on mobile devices, with a score of 96.9%. Next, from statement five, mobile devices are essential for language practice, with the highest score being 99%. After that, statement seven that the flexibility of mobile devices lets them study anywhere and anytime, with a score of 97.9%. This follows statement ten, which is to learn languages more actively with mobile devices, with a score of 97.9%. Finally, the statement stated that 95.8% of female students strongly agree they can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning, as shown in Table 5.

**Table 5**

*Female Students' Perceptions from the Mathematics Education Department*

| Items | SA | A | N | D | SD | Med. | M | SD |
|---|---|---|---|---|---|---|---|---|
| I can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning. | 95.8% | 0% | 0% | 0% | 4.2% | 4.00 | 3.87 | 0.602 |
| I can download language-learning apps. | 96.9% | 0% | 0% | 0% | 3.1% | 4.00 | 3.90 | 0.524 |
| I can customize language learning apps (e.g., settings or self-learning activities). | 90.6% | 0% | 0% | 0% | 9.4% | 4.00 | 3.71 | 0.879 |
| I want to learn languages on mobile devices. | 96.9% | 0% | 0% | 0% | 3.1% | 4.00 | 3.90 | 0.524 |
| Mobile devices are essential for language practice. | 99% | 0% | 0% | 0% | 1% | 4.00 | 3.96 | 0.306 |
| Learning a foreign language on mobile devices is motivating. | 94.8% | 0% | 0% | 0% | 5.2% | 4.00 | 3.84 | 0.670 |
| Mobile devices are flexible and allow me to study anywhere, anytime. | 97.9% | 0% | 0% | 0% | 2.1% | 4.00 | 3.93 | 0.430 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mobile devices help me learn languages. | 95.8% | 0% | 0% | 0% | 4.2% | 4.00 | 3.87 | 0.602 |
| Mobile devices help me learn useful 21st-century skills like communication, collaboration, creativity, critical thinking, and ICT. | 92.7% | 0% | 0% | 0% | 7.3% | 4.00 | 3.78 | 0.784 |
| I learn languages more actively with mobile devices. | 97.9% | 0% | 0% | 0% | 2.1% | 4.00 | 3.93 | 0.430 |
| Mobile devices enable real-life language learning. | 93.8% | 0% | 0% | 0% | 6.3% | 4.00 | 3.81 | 0.730 |
| Upgrade my mobile device(s). | 87.5% | 0% | 0% | 0% | 12.5% | 4.00 | 3.62 | 0.997 |
| My campus has enough mobile learning devices. | 86.5% | 0% | 0% | 0% | 13.5% | 4.00 | 3.59 | 1.031 |
| Campus Internet is fast and reliable for mobile devices. | 78.1% | 0% | 0% | 0% | 21.9% | 4.00 | 3.34 | 1.246 |
| My IT team provides fast, online, and help-desk support. | 88.5% | 0% | 0% | 0% | 11.5% | 4.00 | 3.65 | 0.960 |
| My teachers recommend using mobile devices for language learning in class. | 88.5% | 0% | 0% | 0% | 11.5% | 4.00 | 3.65 | 0.960 |
| My teachers recommend using mobile devices for language learning after class. | 80.2% | 0% | 0% | 0% | 19.8% | 4.00 | 3.40 | 1.201 |
| Peers encourage me to use mobile devices for language learning. | 88.5% | 0% | 0% | 0% | 11.5% | 4.00 | 3.65 | 0.960 |

**SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; Med. = Median; M= Mean; SD = Standard Deviation**

Table 5 also reveals the examination results on female Indonesian pre-service students across departments and genders who can download language-learning apps (M=90). Then, the students were interested in using mobile devices in language learning (M= 90). Next, the students learn languages on mobile devices, with the highest score (M= 3.96). Also, the flexibility of mobile devices allows students to study anywhere and anytime and learn languages more actively on mobile devices (M= 3.93). However, campus internet should be fast and reliable for mobile devices (M=3.34), and teachers should give recommendations to the students for using mobile devices for language learning after class. (M=3.40).

This study reveals that the result of this study from male Mathematics Education Department students strongly agree that the questionnaire results show a positive appreciation for using mobile devices for language learning across departments and genders. Six statements received the highest scores: 5, 6, 7, and 11. Specifically, the first statement from questionnaire number five was that mobile devices are essential for language practice, with its highest score of 100%. Then, statement six is that learning a foreign language on mobile devices is motivating, with a score of 100%. Next, statement seven states that the flexibility of mobile devices lets me study anywhere and anytime, with a score of 100%. Then, statement eleven states that mobile devices enable real-life language learning, with a score of 100%. Moreover, male students strongly agree about using mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning (85.7%), and they can download language-learning apps (92.9%).

Additionally, 78.6% of male students can customize language-learning apps. The reception is positive, but institutional support and infrastructure are viewed differently. Only 64.3% of male students think campus internet should be fast and reliable for mobile devices, and 92.9% of males are ready to upgrade their mobile device(s). Moreover, male students (92.9%) feel that peers encourage them to use mobile devices for language learning, as seen in Table 6.

**Table 6**

*Male Students' Perceptions from the Mathematics Education Department*

| Items | SA | A | N | D | SD | Med. | M | SD |
|---|---|---|---|---|---|---|---|---|
| I can use mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning. | 85.7% | 0% | 0% | 0% | 14.3% | 4.00 | 3.57 | 1.089 |
| I can download language-learning apps. | 92.9% | 0% | 0% | 0% | 7.1% | 4.00 | 3.78 | 0.801 |
| I can customize language learning apps (e.g., settings or self-learning activities). | 78.6% | 0% | 0% | 0% | 21.4% | 4.00 | 3.35 | 1.277 |
| I want to learn languages on mobile devices. | 78.6% | 0% | 0% | 0% | 21.4% | 4.00 | 3.35 | 1.277 |
| Mobile devices are essential for language practice. | 100% | 0% | 0% | 0% | 0% | 4.00 | 4.00 | 0.000 |
| Learning a foreign language on mobile devices is motivating. | 100% | 0% | 0% | 0% | 0% | 4.00 | 4.00 | 0.000 |
| Mobile devices are flexible and allow me to study anywhere, anytime. | 100% | 0% | 0% | 0% | 0% | 4.00 | 4.00 | 0.000 |
| Mobile devices help me learn languages. | 85.7% | 0% | 0% | 0% | 14.3% | 4.00 | 3.57 | 1.089 |
| Mobile devices help me learn useful 21st-century skills like communication, collaboration, creativity, critical thinking, and ICT. | 92.9% | 0% | 0% | 0% | 7.1% | 4.00 | 3.78 | 0.801 |
| I learn languages more actively with mobile devices. | 92.9% | 0% | 0% | 0% | 7.1% | 4.00 | 3.78 | 0.801 |
| Mobile devices enable real-life language learning. | 100% | 0% | 0% | 0% | 0% | 4.00 | 4.00 | 0.000 |
| Upgrade my mobile device(s). | 92.9% | 0% | 0% | 0% | 7.1% | 4.00 | 3.78 | 0.801 |
| My campus has enough mobile learning devices. | 85.7% | 0% | 0% | 0% | 14.3% | 4.00 | 3.57 | 1.089 |
| Campus Internet is fast and reliable for mobile devices. | 64.3% | 0% | 0% | 0% | 35.7% | 4.00 | 2.92 | 1.491 |
| My IT team provides fast, online, and help-desk support. | 85.7% | 0% | 0% | 0% | 14.3% | 4.00 | 3.57 | 1.089 |
| My teachers recommend using mobile devices for language learning in class. | 85.7% | 0% | 0% | 0% | 14.3% | 4.00 | 3.57 | 1.089 |
| My teachers recommend using mobile devices for language learning after class. | 85.7% | 0% | 0% | 0% | 14.3% | 4.00 | 3.57 | 1.089 |
| Peers encourage me to use mobile devices for language learning. | 92.9% | 0% | 0% | 0% | 7.1% | 4.00 | 3.78 | 0.801 |

**SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; Med. = Median; M= Mean; SD = Standard Deviation**

The survey's findings on male Indonesian pre-service students who use mobile devices for language learning across departments and genders. As shown in Table 6, mobile devices are essential for language practice. Learning a foreign language on mobile devices is motivating, and flexible mobile devices allow them to study anywhere and anytime and learn languages more actively with mobile devices (M = 4.00). However, campus internet should be fast and reliable for mobile devices (M= 2.92).

## DISCUSSIONS

The study investigates Indonesian pre-service students' preferences, frequency, and perceptions of using mobile devices across departments and genders for language learning. Then, regarding the first research question about the preferences of mobile devices for language learning across departments

and genders. The study found that female students from both departments prefer smartphones and laptops, whereas male students use them significantly less. Then, this study found that students from the English education department used smartphones as the most popular device, with the number of female users being more significant than that of male students. This finding aligns with the previous study in which the participants also believed that smartphones have minimal negative impacts on the acquisition of English language skills (Sad et al., 2020). Laptops follow a similar pattern, with a higher proportion of female than male students.

Then, the number of female students from the Mathematics education department who use smartphones was more significant than that of male students. Also, most female students use laptops more than male students. This trend highlights a substantial gender difference in the utilization of these two categories of mobile devices. This finding supports the previous studies that gender differences play a significant role in the selection and use of mobile devices for language learning (Al Shammari, 2021); (Gamage & Perera, 2021).

Additional research shows that iPads, tablets, VR headsets, and wearable devices are used to a lesser extent in language learning across departments and genders. This finding supports the previous studies that these technology platforms are designed for commercial use, business productivity, and recreational gaming; educators have found a learning theory gap for classroom applications (Radianti et al., 2020).

According to the data, female students from the English education department prefer tablets and wearable devices, whereas female students exclusively use VR headsets. The low usage of these devices suggests a potential area for future research to determine the underlying reasons for their limited adoption in language learning. Then, findings from the Mathematic department showed that other mobile devices, such as iPads, tablets, VR headsets, and wearable devices, exhibit notably lower usage rates among males and females. For instance, only one female student possesses an iPad, whereas none of the male students have indicated using one. This finding aligns with the previous study that smartphones and laptops are the primary devices for language learning, while other devices are not as frequently used by two departments and genders (Metruk, 2022).

In conclusion, this study emphasizes incorporating gender-specific preferences and behaviors into language learning curricula when using mobile devices, and understanding these distinctions allows educators to tailor their approaches to all students, promoting technology-assisted language learning.

Next, the second research question is about the frequencies of mobile devices used by Indonesian EFL students for language learning across departments and genders. This study found a significant gender gap in using other mobile devices, with female students exhibiting slightly more diverse usage patterns than male students, highlighting the importance of considering gender when implementing technology-enhanced language learning programs almost daily in the form of smartphones and laptops (Al Arif et al., 2023; Aslan, 2023; Liu, 2023).

This study shows that mostly female and male students from English and mathematics education use smartphones and laptops for language learning. This confirms previous research that smartphones and laptops are essential, particularly for female students to learn a language (Metruk, 2021; Nami, 2020); (Şad et al., 2020), while other devices are less common in the form of iPads, tablets, VR headsets, and wearables. This shows how essential smartphones and laptops are to these students' education, while other devices have less impact. Moreover, these findings indicate that while smartphones and laptop computers are essential to students' learning processes, other mobile devices may be less widely adopted or available in this educational setting. In sum, these findings are critical for educators and policymakers to consider when developing technology-based learning strategies to ensure they are consistent with students' preferences and usage patterns.

Next, it relates to the third research question about how EFL students respond to mobile devices for language learning across departments and genders. This study found that Indonesian pre-service students from the English and Mathematics Education Departments responded positively after using mobile devices for language learning across departments and genders. Results also showed that the students used mobile devices' voice recording, voice recognition, camera, video editing, photo editing, and other features for language learning. This confirms previous research that most students

recognize mobile devices' benefits for language learning, including improving knowledge and skills and developing 21st-century skills like communication and critical thinking (Sari & Wardhani, 2020; Thaha, 2021; Yeni, 2022). The study's findings indicate that Indonesian pre-service students both from English and Mathematics Education Department have high competence and enthusiasm regarding using mobile devices in the instructional language learning process. Users from two genders are highly familiar with mobile technologies and willing to incorporate them into their learning routines.

Nevertheless, additional institutional support and an improvement in the internet infrastructure are required to make the most of the advantages offered by mobile devices. When these areas are addressed, it can further improve students' language learning experiences and outcomes. In sum, the result of the study shows that Indonesian pre-service English education students across departments and genders gave positive perceptions and high engagement in using mobile devices to learn languages from across departments and genders.

## CONCLUSIONS

This study examines pre-service Indonesian language learners' mobile device usage preferences, frequencies, and perceptions across departments and genders. In addition, the study exposes the challenges Indonesian pre-service students encountered when incorporating language learning technology into the classroom. This study found that Indonesian pre-service English education students primarily use smartphones and laptops for language learning, with significant gender differences in using other mobile devices. Female students, in particular, use a broader range of mobile devices than their male counterparts. On the other hand, mathematics education students rely heavily on smartphones and laptops for language learning while neglecting other mobile devices, with both male and female students exhibiting similar usage patterns. Female students in the English and Mathematics education departments report using smartphones almost daily, with very positive views of these devices' role in language learning. This daily use highlights smartphones' critical role in their educational routines, facilitating various learning activities and providing continuous access to academic resources. The positive feedback from these students emphasizes the effectiveness and convenience of mobile devices in aiding language acquisition efforts.

Despite the advantages, mobile devices for language learning have major drawbacks across departments and genders. These include potential distractions from non-educational content, technical issues like connectivity issues and device malfunctions, and a lack of structured guidance on effectively incorporating these tools into the learning process. These challenges can impede the most effective use of mobile devices, reducing their potential to improve language learning outcomes. Then, it identifies significant challenges that must be addressed to maximize their use. Educational institutions can better support students across departments and genders in leveraging mobile devices for effective language learning by implementing targeted strategies and providing appropriate guidance. In conclusion, Indonesian pre-service students use smartphones and laptops for language learning, and this study shows their positive perceptions.

The researchers made several recommendations based on the study's findings, and pre-service Indonesian students can use these implications to improve their use of mobile devices for language learning. Educational institutions should train students on effective mobile learning strategies and establish guidelines to reduce distractions. Furthermore, promoting gender-specific approaches to address the disparities in preferences and challenges faced by male and female students may improve the overall learning experience. By addressing these issues, educators can better support using mobile devices in language education, maximizing their benefits while minimizing potential drawbacks.

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