Mobile Technology-Mediated Language Learning: A Quantitative Study to Unravel Language Learners' Achievement and Autonomy

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Abstract

This study investigates the impact of mobile technology-mediated language learning (MTMLL) on the learners' Balinese language learning achievement and autonomy. A quantitative approach research with quasi-experimental and survey designs was conducted. The data were collected through the tests and MTMLL questionnaire administration to fifty-eight primary school students in Bali, Indonesia. The data were analyzed statistically using SPSS 23 version. The results indicate that MTMLL has a positive impact on learners' achievement and autonomy. Participants reported that learners using MTMLL showed higher levels of achievement compared to those who did not use this technology. Additionally, MTMLL provided them with more control over their learning and allowed them to study at their own pace and convenience. The findings of this study contribute to the literature on MTMLL and local language learning by highlighting the importance of technology in promoting learners' achievement and autonomy. The study suggests that MTMLL can be an effective tool for language learners to enhance their learning experience and achieve better outcomes.

Keywords: achievement, autonomy, language learning, mobile technology-mediated language learning

1. Introduction

Language learning has always been a complex and challenging process, requiring learners to acquire new vocabulary, master grammar rules, and develop fluency in the target language. In the last decade, the development of technology has touched on and contributed to the enhancement of education, including language learning. Matsumoto et al. (2020) stated that technology could help language learners to achieve better academic success. The learners are also motivated by the sophistication of technology performance and presentation (Schindler et al., 2017). Also, technology provides various positive support for language teachers to assist their students in learning since it increases learners' autonomy (Carstens et al., 2021). Due to its functionality, technology attends various language learning contexts, i.e., in the classroom, outside the classroom, during the project, when the learners' are doing their tasks, and even when the learners are enjoying their relaxed learning time. Hence, many educators take these benefits by employing technology to mediate their language teaching (Muslimin et al., 2023) and boost their students' language learning.

In recent years, advances in mobile technology have revolutionized the way language learning takes place (Bachore, 2015). Mobile technology-mediated language learning (MTMLL) has gained increasing popularity among language learners, offering them the ability to access language learning materials anytime and anywhere, as well as providing them with personalized and interactive learning experiences (Chen et al., 2020). Moreover, nowadays, language learners at any level of education live closer to mobile technology, i.e., smartphone or mobile phone, compared to the conventional computer or laptop. Therefore, the language teachers' approach to guide their students' time to learn the language by assigning them to play language games or run language applications on their mobile phones is appropriate.

MTMLL has the potential to boost language learning in various ways. First, mobile technology (MT) allows language learners to access personalized learning experiences that cater to their learning styles and preferences. Some language learning apps like Duolingo and Babbel offer adaptive learning algorithms that adjust the difficulty level of lessons based on learners' performance while also providing feedback and recommendations for improvement (Chen & Chen, 2016; Li et al., 2018). Second, MT allows language learners to learn at their own pace and schedule (flexible and convenient), making it convenient for learners to fit language learning into their busy lives. Learners can access language learning resources anytime, anywhere, and on any device, which makes it easier to integrate language learning into daily routines (Elgendy, 2019). Third, MT provides access to authentic language resources such as podcasts, news articles, and social media platforms in the target language. This exposure can help learners improve their listening and reading comprehension and also provide them with a better understanding of the culture and context of the language (Zhang & Chen, 2019). Fourth, MT can provide learners with interactive and engaging learning experiences that make language learning more enjoyable and motivating. Language learning apps often use gamification features such as points, badges, and leaderboards to incentivize learners and create a sense of achievement (Li et al., 2020). Therefore, these positive reflections of mobile technology implementation in language learning should also

be induced to language learning circumstances in various contexts, including the teaching and learning of the local language, i.e., the Balinese language.

Learning the Balinese language poses unique challenges for language learners (Al-Rawafi & Syihabuddin, 2019), including primary school students (Dhanawaty, 2013). The Balinese language has a complex structure with a wide range of dialects and registers, which can vary depending on the social context and the speaker's status (Suwendi, 2021). In addition, there is limited availability of learning resources, including textbooks, dictionaries, and language learning software, which makes it difficult for learners to practice and improve their language skills. Studies have shown that difficulties in learning the Balinese language can impact the student's learning achievement. For example, a study by Suardika and Suarnajaya (2017) found that the lack of motivation and interest, as well as the limited availability of learning resources, can affect students' achievement in learning the Balinese language. Similarly, the student's attitude toward the language and their sense of cultural identity can also impact their learning achievement.

To overcome these challenges and improve students' learning achievement, mobile technology can be used as a mediation tool. Mobile devices can provide learners with access to a wide range of learning resources and elevate the students' learning interests, which can support their language learning outside the classroom. For example, Suardika and Suarnajaya (2017) conducted experimental research to apply mobile devices to support Balinese language learning among 30 primary school students in Bali. They found that the use of mobile devices, such as smartphones and tablets, helped to enhance students' engagement, motivation, and autonomy in their learning process. Furthermore, a quasi-experimental study of 155 Taiwan students has shown that mobile technology-mediated language learning can boost learners' achievement and autonomy in language learning (Huang et al., 2019). For instance, an experimental study of 70 school students by Wang et al. (2020) found that the use of mobile apps for Chinese language learning among international students in China helped to improve their language proficiency and autonomy.

While there has been an increasing interest in Mobile technology-mediated language learning (MTMLL) in recent years, research that specifically focuses on students' autonomy and achievement in the Balinese language learning context, especially at the primary school level, i.e., elementary level, is still relatively scarce. For instance, action research by Khoiriyah et al. (2018) examined the use of a mobile learning application to improve the speaking ability of 30 Indonesian university EFL learners, but the study did not specifically focus on Balinese language learners and touched the primary school level. Similarly, an experimental study by Yanuarti and Istanti (2018) investigated the use of a mobile application in supporting independent language learning among 36 EFL learners, but the study did not specifically examine Balinese language learning. Another action research by Astuti and Yusuf (2017) explored the use of a mobile application for vocabulary learning among 30 Indonesian university language learners, but the study focused on something other than Balinese language learning. Additionally, an experimental study by Permatasari and Al-Karim (2019) investigated the use of a mobile application in promoting 70 students' autonomous learning ability, but the study did not examine the use of MTMLL in Balinese language learning. Overall, while there has been a growing interest in MTMLL in language learning, research specifically focusing on students' autonomy and achievement in the Balinese language learning context at the primary school level is still relatively scarce. More research is needed to explore the effectiveness of MTMLL in Balinese language learning and its impact on students' autonomy and achievement. Then, Dhanawaty (2013) emphasizes her finding to attend an interactive technology in the Balinese language learning context. Therefore, the findings of the research can be a model for the generalizability of imitating empirical practices to overcome local or specific language learning challenges in various settings.

To address this research gap, this quantitative study investigates the effects of MTMLL on Balinese language learners' autonomy and achievement. The researchers were interested in unraveling the effects of *the Belajar Bahasa Bali* application (see Figure 3) on primary school students who faced challenges in learning the Balinese language. The study aims to contribute to the literature on MTMLL and local language learning by providing insights into the potential of this technology to enhance learners' autonomy and achievement in elementary education settings. Henceforth, the formulation of problems is developed as follows:

1. What was the impact of MTMLL implementation on the student's achievement in learning the Balinese language?
2. What was the impact of MTMLL implementation on the students' autonomy in learning the Balinese language?

2. Literature Review

Achievement in language learning

Language learning achievement refers to the level of proficiency or success that language learners have achieved in mastering a particular language. Mobile technology has become increasingly popular as a tool to support language learning, and recent studies have explored its effects on language learning achievement. One study by Lin et al. (2021) investigated the effects of a mobile app on the language learning achievement of Chinese university students learning Japanese. The study found that the use of the app significantly improved learners' language learning achievement, particularly in listening and speaking skills. Another study by Wu and Wu (2019) examined the effects of a mobile app on English language learning achievement among Taiwanese university students. The study found that the use of the app was associated with improved language learning achievement, particularly in vocabulary and reading comprehension. Furthermore, a study by Almahmoud et al. (2020) explored the effects of a mobile vocabulary learning app on the language learning achievement of Saudi Arabian EFL learners. The study found that the use of the app significantly improved learners' vocabulary knowledge and language learning achievement. Overall, these few studies suggest that mobile technology can have a positive impact on language learning achievement. Moreover, the authors found very limited research discussing the implementation of mobile technology to elevate local

language learning achievement, i.e., the Balinese language.

Autonomy in language learning

Learner autonomy in language learning refers to the ability of learners to take responsibility for their learning, make decisions about what, how, when, and where they learn, and monitor their progress (Benson, 2018). The concept of learner autonomy is important for language learning because it empowers learners to take control of their learning process and to develop the skills and strategies that will enable them to continue learning beyond the classroom (Little, 2019).

Several factors can influence learner autonomy in language learning. These include individual factors such as motivation, self-efficacy, and learning styles, as well as contextual factors such as the learning environment, the role of the teacher, and the availability of learning resources (Li, 2019; Tella, 2020). For example, research has shown that learners who are more intrinsically motivated tend to be more autonomous in their learning (Li, 2019) and that learners who are provided with a supportive learning environment and appropriate guidance from their teacher are more likely to develop autonomy (Tella, 2020).

The learners' autonomy to learn a language is also impacted by the implemented technology by the language teachers. For instance, a study by Wang et al. (2020) investigated the use of a mobile learning platform to enhance learners' autonomy in Chinese language learning. The study found that the platform improved learners' ability to plan, monitor, and evaluate their learning progress and promoted their sense of autonomy and responsibility in learning. Similarly, a study by Alghamdi and Abo-Khalifa (2019) explored the use of a mobile application to promote autonomous vocabulary learning among EFL learners in Saudi Arabia. The study found that the application improved learners' motivation and engagement in vocabulary learning and promoted their sense of autonomy in learning. Another study by Liang and Li (2018) investigated the use of online collaborative tools to support autonomous language learning among Chinese EFL learners. The study found that the tools facilitated learners' communication and collaboration and promoted their sense of autonomy and responsibility in learning. This study promotes the relationship between technology implementation with the development of language learners' autonomy. However, the evidence of a similar relationship needed to be depicted to discuss the Balinese language learning context.

Balinese language learning

Balinese language, also known as Basa Bali, is a Malayo-Polynesian language spoken by the Balinese people in Bali, Indonesia. The Balinese language is considered to be a difficult language to learn due to its complex grammar, unique phonetics, and the use of various registers and levels of formality. In Balinese language learning, mobile technology can be used as a tool to facilitate and enhance learning. For example, mobile apps and platforms can provide interactive and engaging language learning materials, such as vocabulary flashcards, pronunciation practice, and conversation simulations. However, there is still a limited amount of research on the use of mobile technology-mediated language learning (MTMLL) specifically in the context of Balinese language learning. This highlights the need for further investigation into the effectiveness of MTMLL in promoting language learners' autonomy and achievement in the Balinese language.

Despite the limited research on MTMLL in Balinese language learning, some studies have explored the use of mobile technology in language learning more broadly. For example, a study by Kim and Kwon (2018) investigated the effectiveness of a mobile vocabulary learning app in promoting English language learning among Korean learners. The study found that the app significantly improved learners' vocabulary acquisition and retention. Another study by Huang et al. (2019) examined using a mobile-based English learning platform to promote autonomous learning among Taiwanese learners. The platform allowed learners to set their own learning goals and track their progress, which was found to promote their motivation and autonomy in learning English. Overall, while research on MTMLL in Balinese language learning is still limited, these studies suggest that mobile technology can effectively promote language learning achievement and autonomy. Further research is needed to explore the potential of MTMLL, specifically in the context of Balinese language learning.

Conceptual Framework

The conceptual framework for the research entitled "Mobile Technology-Mediated Language Learning: A Quantitative Study to Unravel Local Language Learners' Achievement and Autonomy" is based on the following assumptions:

1. Mobile Technology-Mediated Language Learning (MTMLL) can improve language learning achievement and autonomy among local language learners.

2. Balinese language learning poses unique challenges to local language learners due to its complexity and limited learning resources.

3. The Belajar Bahasa Bali application is a suitable tool for mobile technology-mediated language learning (MTMLL) in the Balinese language learning context.

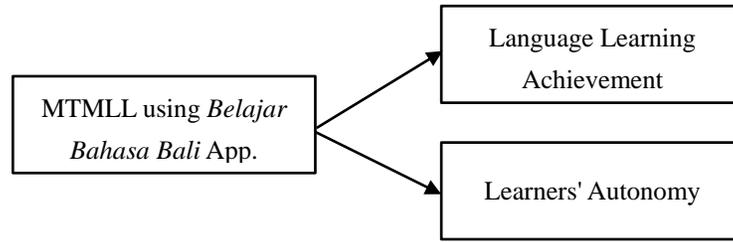Based on these assumptions, the following conceptual framework is proposed:

Figure 1. Research Conceptual Framework

3. Method

Research Design

This quantitative study used a quasi-experimental design with the pre-test and post-test model, complemented by a survey design, to scrutinize the implementation of MTMLL using *Belajar Bahasa Bali* application to the students' Balinese language learning achievement and autonomy. The quantitative approach was chosen since this study gathered numerical data from the tests (pre- and post-test) and the survey. The detailed research designs implementations are described in Figure 2.
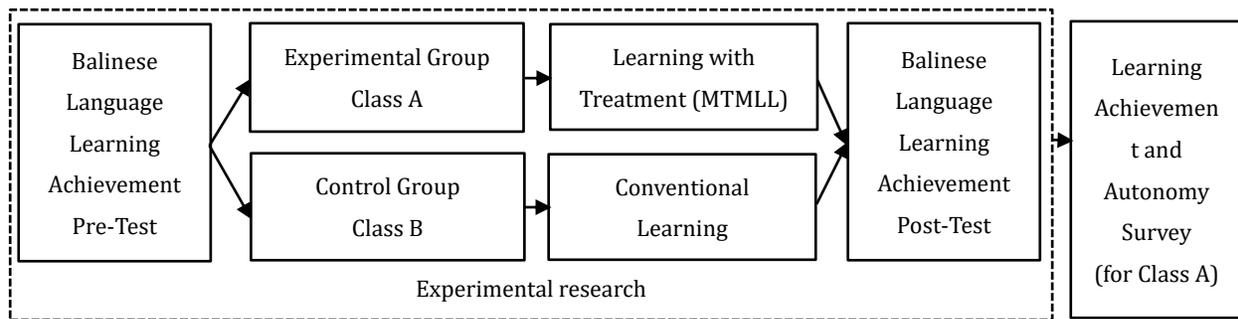

Figure 2. Research Design Implementations

Participants

The participants of this study were fifty-six fifth-grade primary school students who studied the Balinese language in an elementary school in Badung district, Bali, Indonesia. The participants ranged in age from 10-11 years old, separated into 15 females and 13 males, and most started to learn the Balinese language when they were in the first grade. The participants were divided equally in number into class A and class B which were called group A (experimental group) and group B (control group). So, the sampling technique applied was non-randomized sampling since the researcher could not manipulate the group division. The participants' homogeneity was tested before experimenting, and the results are shown in Table 1 (see Findings, Table 1).

Instruments

To obtain the answers to the research problems, this study employed two instruments, namely Balinese language tests (Pre- and Post-test) and the MTMLL questionnaire (see Appendix 1). The Pre-test and Post-test were used to know the impact of MTMLL using *the Belajar Bahasa Bali* App within the groups (A/experimental group). Then, the post-test results from both groups (A and B) were compared to know whether the experimental group (group A) had better performance in learning the Balinese language than the control group (group B) upon the treatment. Then, after the experiment was conducted, the experimental group (group A) was administered the MTMLL questionnaire to obtain their responses on the MTMLL treatment toward their achievement and autonomy. The MTMLL questionnaire comprised participants' demographic information, their experience with implementing MT for Balinese language learning, and their responses on the impact of MTMLL treatment on their learning achievement and autonomy.

Data Collection and Analysis

To collect the data, the researchers used both instruments, namely the Balinese language tests (Pre- and Post-test) and the MTMLL questionnaire. The pre-test was conducted in the first week of October 2022, and the post-test was done in the last week of November 2022. Between these tests, the participants in the experimental group experienced learning the Balinese language with *the Belajar Bahasa Bali* app. This application can be downloaded from the application store. The interface of the application is shown in Figure 3.

Figure 3. The interface of *Belajar Bahasa Bali* android application

Upon the test administration, the researchers statistically analyzed the scores using SPSS 24 version. After that, the researchers collected the students' responses regarding their learning achievement and autonomy, which later transformed into scores. These scores were also analyzed descriptively statistically using SPSS 24 version. To comprehend the students' response levels, the researcher looked for the average learning achievement and autonomy scores and compared them with the students' response options (strongly agree, agree, neutral, disagree, and strongly disagree).

4. Findings

The present research was conducted to scrutinize the impacts of MTMLL using *the Belajar Bahasa Bali* application on primary school students' Balinese language learning achievement and autonomy. Therefore, the findings are presented following these objectives. However, before the experiment, the researchers tested the homogeneity of the participants. The results of the homogeneity test are shown in Table 1.

Table 1. The homogeneity test results

Levene Statistic	df1	df2	Sig.
.000	1	54	1.000

According to the Levene statistic test using SPSS 23 version, the significance score of homogeneity was 1.000 or higher than 0.05. It means that both groups (the experimental – class A and the control – class B) were homogeneous, and the experiment could be continued to the next steps (providing treatment to group A and conventional teaching to group B). Then, after all data from the tests (pre- and post-tests) had been collected, the descriptive statistics analysis was conducted, with the results in Table 2.

Table 2. Descriptive Statistics of the Pre-Test and Post-Test Scores from Both Groups

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Score G-A	28	76	83	77.89	1.771
Post-Test Score G-A	28	84	95	87.39	2.833
Pre-Test Score G-B	28	76	83	77.82	1.679
Post-Test Score G-B	28	77	88	79.93	2.403
Valid N (listwise)	28				

The impact of MTMLL implementation on the student's achievement in learning the Balinese language

To understand the MTMLL impact on the students' language learning achievement, the impacts were seen from the different scores (pre- and post-tests) of the experimental group (Group A) and the comparison of post-test scores from both the experimental and control group. After conducting statistical calculations, the impact of MTMLL treatment on the experimental group is presented in Table 3.

Table 3. The paired scores comparison of the experimental group (Group A)

		N	Correlation	Sig.
Pair 1	Pre-Test Score G-A & Post-Test Score G-A	28	.902	.000

Based on Table 3, the experimental group (Group A) students' scores on the post-test were better, with a mean score of 87.39 or higher than their pre-test scores (mean score = 77.89). In addition, the Sig. Two-tailed value of p was 0.000, which was lower than 0,05. This finding depicts a significant difference between the pre-test and post-test scores of experimental groups (Group A), which means that MTMLL treatment improved experimental group students' achievement in learning the Balinese language.

Comparing the results of the post-test of both experimental and control groups, the experimental group score had a significant difference from the control group, with the detailed statistic results in Table 4.

Table 4. The Post-Tests Scores Comparison between the Experimental Group (Group A) and Control Group (Group B)

Post-Test Scores (ANOVA)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	780.018	1	780.018	113.066	.000
Within Groups	372.536	54	6.899		
Total	1152.554	55			

Table 4 shows that the significance score was 0.000 or lower than the probability score of 0.05. It means the experimental group's post-test score was not homogeneous with the control group. The inclination score of the experimental group score was higher after the MTMLL treatment than the increasing score of the control group, which was taught using conventional teaching. These findings depict that MTMLL using *the Belajar Bahasa Bali* application significantly impacted the students' language learning achievement.

The participants' test scores confirmed the impact of MTMLL treatment on the experimental group, and the participants responded to the MTMLL questionnaire. Then, according to the survey, the results are described in Figure 4.
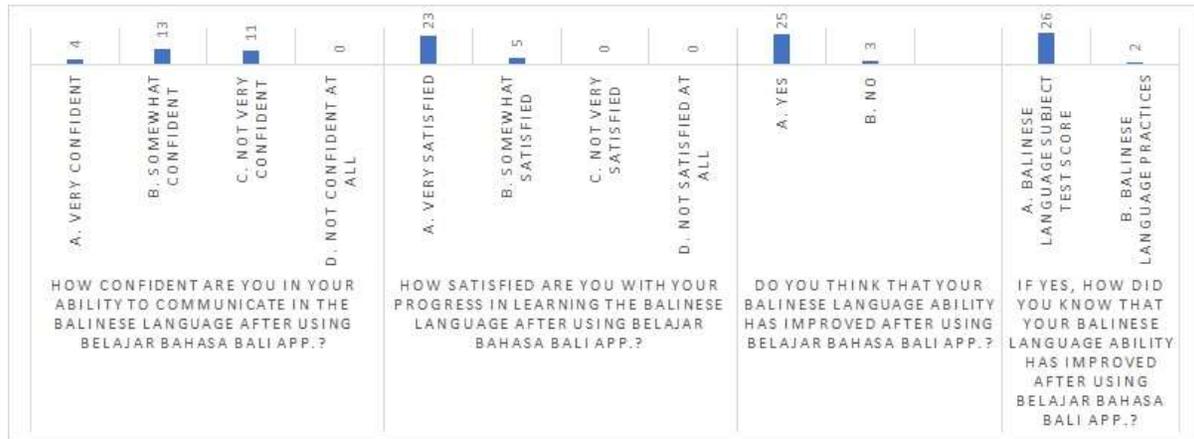

Figure 4. The participant's responses on the impact of MTMLL on their Balinese language learning achievement

Figure 4 unveils facts that most of the students in the experimental group (25 participants) considered MTMLL treatment using the *Belajar Bahasa Bali* application as very effective in improving their Balinese language learning progress. The 23 students said that they obtained satisfying language learning progress. The majority said that the application helped them to conquer the test in their Balinese language subject. At the same time, some said that it aids them to comprehend more Balinese language elements i.e. vocabulary and language grammar to support the language practices. However, many of them (13 students) considered that the application could not optimally leverage their ability to communicate with the learned language, although four students could communicate confidently in the Balinese language after the MTMLL treatment. Then, close to half of the participants (11 students) still needed to be more confident in applying the Balinese language in oral communication after applying the mobile technology application. Finally, the findings in Figure 4 support and confirm the statistical calculation findings in Table 4.

The impact of MTMLL implementation on the students' autonomy in learning the Balinese language

The second research problem was intended to find whether MTMLL treatment could support the emergence of the participants' Balinese language learning autonomy. Then, with the administration of the MTMLL questionnaire, the participants (in the experimental group or group A) shared their responses, as seen in Figure 5.
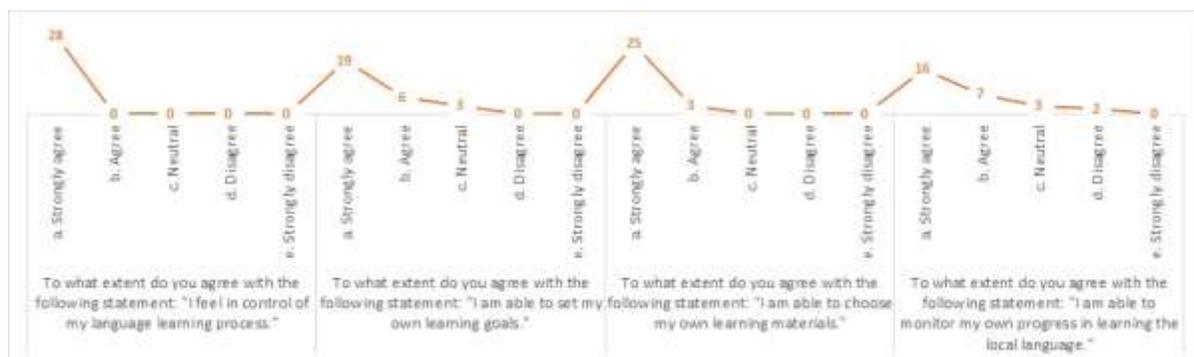

Figure 5. The participant's responses on the impact of MTMLL treatment on their Balinese language learning autonomy

Figure 5 shows that most participants obtained Flexibility, such as setting their own learning goals and choosing the best-matching personal learning materials. Then, all participants agreed that they could control their learning process during the Balinese language learning.

However, not all participants agree that they could monitor their progress. Five (18%) participants stated they could not monitor their learning. So, these findings claimed that most participants were autonomous during the preparation and process of Balinese language learning. While some considered themselves could not evaluate their learning through the mobile technology application.

5. Discussion

The attendance of mobile technology to mediate teaching and learning of any language gained in numbers lately (Bachore, 2015), especially due to the popularity of the 21st-century education trend where digital technology literacy becomes one of the students' essential skills to possess, the introduction to 4.0 industrial revolution that requires students to be globally competitive with technology (Lu & Cutumisu, 2022; Muslimin et al., 2023), and the benefits of technology implementation to mediate teaching and learning challenges (Chen et al., 2020). Then, this research showed the attempts of a Balinese language teacher in a primary school to try using an android application that is downloadable for mobile phones to mediate the students' challenges in learning the Balinese language. Hence, this study unveiled the findings on the effect of *Belajar Bahasa Bali* application implementation as MTMLL treatment on the participants' language learning achievement and autonomy.

According to the findings, the participants of this study experienced a positive effect of implementing MTMLL on their learning achievement (Alamound et al., 2020; Lin et al., 2021; Wu & Wu, 2019). The participants in the experimental group gained higher scores in their post-test compared to their pre-test scores on Balinese language tests. They also gained quite a lot of post-test score margin compared to the control group (see Table 2). The MTMLL questionnaire administration also confirmed that the application successfully improved the students' Balinese language learning. Corresponding to these results, the participants said that the application was helpful for them in increasing their Balinese language vocabulary and grammar. The participants enjoyed and subconsciously accepted language materials by playing the games inside the applications (Smiderle et al., 2020). They had less language learning anxiety and more personalized learning materials. Rivera and Garden (2021) said that gamification with technology could leverage learning achievement and reduces stress. Gamified language learning aids learners in enjoying challenging language components learning and changes into interesting activities (Li et al., 2020; Smiderle et al., 2020).

Nevertheless, the significant effect of the MTMLL treatment appeared on the students' learning achievement since the students did the language test only for the receptive skills (reading) and language elements (vocabulary and grammar). Therefore, the student's responses only partially supported using this application to improve Balinese communication skills. Bachore (2015) said that not all mobile technology equips all language skills. Therefore, in the context of Balinese or any other language teaching and learning where productive skills become the focus, language teachers should seek the most appropriate mobile technology to insert (Khoiriyah et al., 2018).

Discussing the second objective of this research, the impacts of MTMLL treatment on the students' Balinese language learning autonomy, the participants admitted that the application led them to be autonomous Balinese language learners. Benson (2018) stated that the autonomy of language learners is seen from their ability to manage the preparation, during, and evaluation of their learning. While the study participants could prepare for their learning needs, they could control their learning process, and some could only evaluate their learning. These findings were confirmed by Octaberlina and Muslimin's (2021) study showing that the online TOEFL course participants portrayed autonomous learners' characteristics only in the preparation and during the course process. The participants considered that evaluation was not their priority in joining language learning, and the online technology did not provide explicit evaluation features (Schindler et al., 2017). However, the study participants said that the MTMLL application showed the score upon finishing playing the games, meaning that they could see the score's development as the evaluation of their learning.

During the preparation for learning the Balinese language, the participants could manage their learning more personally (Chen & Chen, 2016; Li et al., 2018). The participants could set their learning goals and make the priority of learning materials that they should learn earlier. Understanding the personal goals of learning could issue the language learners' internal motivation. Similarly, Flexibility in choosing the materials creates enjoyment and reduces learning anxiety (Elgendy, 2019). These interesting effects of Flexibility also can be the Balinese language learners' internal motivation (Cetin & Bölükbaşı-Macit, 2022). Another possible factor to emerge in the participants' motivation was the participants' ability to control their learning. They could repeat the more complicated materials, find the most convenient ways of learning by choosing games in the application, obtain authentic Balinese language listening resources, and respond interactively to the quizzes in the app (Li et al., 2018; Rivera & Garden, 2021). According to Liu (2022), internal motivation can maintain language learners' efficacy and consistency in learning. Hence, the MTMLL treatment proposed a similar implementation in a different language learning context to gain benefits for the students.

Reviewing the above discussion, the MTMLL treatment using *the Belajar Bahasa Bali* application positively affected the Balinese language learners' learning achievement and autonomy. However, according to the participant's responses, the applied mobile technology supported more to enhance students' receptive skills and language elements comprehension rather than productive skills. Hence, this study proposed further investigation due to its limitation.

6. Conclusion

The present research findings unravel the impact of MTMLL treatment using *the Belajar Bahasa Bali* application on primary school students' Balinese language learning achievement and autonomy. The results proved that the application significantly affected learning achievement, as supported by the statistical significance score of 0.000 and the participant's responses on the MTMLL survey. The students' learning autonomy was also depicted mainly in the learning preparation and process due to the treatment. Only some showed autonomous

learning characteristics in the evaluation stage. Hence, this study promotes a similar implementation of mobile technology to assist students' learning of receptive language skills and language elements, i.e., vocabulary and grammar.

In addition, this study's findings have several implications for language learning practitioners and researchers. Firstly, the study highlights the importance of integrating mobile technology into language learning programs. Mobile technology offers opportunities for learners to practice language skills and elements flexibly and autonomously, which can enhance learning achievement. Secondly, the study indicates that mobile technology can support learners' autonomy, an important factor in successful language learning. Thirdly, it robust the limited number of studies to discuss the use of mobile technology to mediate challenges in learning a specific or local language. Lastly, though this study sounds local, the idea of mediating language learning challenges and improving teaching quality through applying MT can be generalizable for future research adaptation.

Nevertheless, this study has some limitations that need to be considered when interpreting the findings. Firstly, the study only focused on local language learners, so the generalizability of the findings to other contexts may be limited. Secondly, the study used a quantitative approach, which may not fully capture the complexity and nuances of language learning experiences. Thirdly, the study did not investigate the impact of different types of mobile technology on language learning outcomes. Therefore, future research should consider these limitations and conduct more in-depth and diverse studies to understand MTMLL comprehensively.

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Appendix 1. Research Instrument: Mobile Technology-Mediated Language Learning Survey for Primary School Students

This survey is designed to investigate the role of mobile technology (MT) in language learning and its impact on learners' autonomy and achievement among elementary school students who are learning the Balinese language. Your participation in this survey is voluntary and your responses will be kept confidential. The survey will take approximately 5-10 minutes to complete. Please answer all the questions to the best of your ability, in responses column.

No	Items	Options	Responses
	Section 1: Demographic Information		
1	What is your age?	a. 6-7 years b. 8-9 years c. 10-11 years d. 12-13 years	
2	What is your gender?	a. Male b. Female	
3	What is your native language?	a. Bahasa Indonesia b. Balinese Language c. Other:…	
4	How long have you been learning the Balinese language?	a. Less than 1 year b. 1-2 years c. 2-3 years d. More than 3 years	
	Section 2: Mobile Technology and Language Learning		
5	Do you use mobile technology (e.g., smartphone, tablet) to learn the Balinese language?	a. Yes b. No	
6	If yes, how frequently do you use mobile technology to learn the Balinese language?	a. Daily b. Several times a week c. Once a week d. Rarely e. Never	
7	How useful do you find mobile technology *Belajar Bahasa Bali* app. in learning the Balinese language?	a. Very useful b. Somewhat useful c. Not very useful d. Not useful at all	
8	What are the benefits of using mobile technology *Belajar Bahasa Bali* app. for language learning? (Select all that apply)	a. Flexibility in learning b. Convenience in learning c. Access to language learning materials d. Opportunity to practice speaking with others e. Opportunity to interact with native speakers f. Other (please specify)	
	Section 3: Learning Achievement		
9	How confident are you in your ability to communicate in the Balinese language after using *Belajar Bahasa Bali* app.?	a. Very confident b. Somewhat confident c. Not very confident d. Not confident at all	
10	How satisfied are you with your progress in learning the Balinese language after using *Belajar Bahasa Bali* app.?	a. Very satisfied b. Somewhat satisfied c. Not very satisfied d. Not satisfied at all	
11	Do you think that your Balinese language ability has improved after using *Belajar Bahasa Bali* app.?	a. Yes b. No	
12	If yes, how did you know that your Balinese language ability has improved after using *Belajar Bahasa Bali* app.?	a. Balinese language subject test score b. Balinese language practices	
	Section 4: Learner Autonomy		
13	To what extent do you agree with the following statement: "I feel in control of my language learning process."	a. Strongly agree b. Agree c. Neutral d. Disagree e. Strongly disagree	
14	To what extent do you agree with the following statement: "I am able to set my	a. Strongly agree	

	own learning goals."	b. Agree c. Neutral d. Disagree e. Strongly disagree	
15	To what extent do you agree with the following statement: "I am able to choose my own learning materials."	a. Strongly agree b. Agree c. Neutral d. Disagree e. Strongly disagree	
16	To what extent do you agree with the following statement: "I am able to monitor my own progress in learning the local language."	a. Strongly agree b. Agree c. Neutral d. Disagree e. Strongly disagree	