The Exploration of Duolingo Application for Vocabulary Building and Pronunciation of Pre-Service Teachers

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Abstract. Teaching and learning vocabulary and pronunciation is challenging for foreign language learning. Currently, the majority of vocabulary and pronunciation teaching in the classroom employs traditional and uninspiring approaches. Conversely, gamification-based technology in the educational environment is believed to facilitate learners' progress and skills. This study aims to investigate the potential of gamification-based technology media, specifically Duolingo, to enhance prospective English teachers' English vocabulary and pronunciation skills. This study employed a quantitative approach. The study was conducted at a private university in Jakarta with 72 students as participants. The results of this study indicate that most participants perceive learning a foreign language, particularly vocabulary and pronunciation, through Duolingo as relatively straightforward due to the numerous conversation exercises with diverse vocabulary. Several findings corroborate this regarding Duolingo's facilities, which include ease of access, variety of topics and information, and a positive effect on learners' motivation and enthusiasm for learning English. This research implies that Duolingo is an effective tool to support learners in learning foreign languages, especially vocabulary development and English pronunciation, which is easy and enjoyable.

Keywords: Duolingo Application; Vocabulary Building; Pronunciation practice

1. INTRODUCTION

Vocabulary and pronunciation are essential in determining how well language learners can improve their other language skills, such as reading, writing, speaking, and listening to the target language they are learning [1]. In line with this, [2] asserts that communication will not do anything without being accompanied by vocabulary and pronunciation even though the language learners have mastered other language components such as grammar [3]. The meaning of vocabulary itself can be defined as a set of lists of words in a particular language that are used by individual native language speakers and understood both individually in groups of the language itself Hatch and Brown as cited in Haryati [4], while pronunciation can be interpreted as the way a word or language is mentioned [5]. For this reason, building vocabulary and pronunciation is the right first step in acquiring language skills.

Unfortunately, study after study has revealed that many pre-service English teachers in Indonesia have inadequate mastery of English vocabulary and pronunciation [6]. Another obstacle is the unavailability of an efficient and boring learning model, which hampers the existing learning process. For that, an attractive learning model is needed for pre-service teachers to create an efficient and fun English learning atmosphere. Technology can support foreign language learners in improving and simplifying their learning process to connect with native speakers and other learners worldwide [7]. Technology can support foreign language learners in improving and simplifying their learning process to connect with native speakers and other learners around the world [7]. Technology in foreign language learning allows learners to learn vocabulary and pronunciation more efficiently using the help of technology in the form of applications specifically designed for foreign language learners to expand their vocabulary [8]. Related to this, application-based technology such as Duolingo can help foreign language learners improve their vocabulary and pronunciation skills. That is why Duolingo is a prevalent language-learning application with a high usage rate. In addition, this application can be accessed for free through the Duolingo.com website or by downloading the application first on the Google Play Store

Duolingo uses a gamification-based learning approach in its Mobile Assisted Language Learning (MALL) application. According to [9], Gamification is a term used to explain learning based on games to improve knowledge and understanding of English. Previous research on using Duolingo apps in language learning has revealed promising results in Duolingo's ability to improve users' English vocabulary acquisition and increase students' motivation to improve their vocabulary learning experience [10], [11]. Several previous studies on the benefits of the Duolingo app in learning English vocabulary mastery [12], found that the students had positive perceptions and attitudes towards using Duolingo in English language learning. In addition, the same study conducted by [13], [14] shows that the use of the Duolingo app is proven to help with vocabulary learning and other grammar skills such as listening, pronunciation, reading, speaking, and writing. These studies show that the Duolingo app is seen as having a positive impact in helping EFL and non-EFL learners improve their English skills. The appearance of the Duolingo application, which is simple, fun, easy to use, and can be accessed anywhere, is the plus point of this application.

Based on some limitations in the previous research. Since the previous research only focuses on organizing data to find out whether Duolingo is efficacious in improving learners' English vocabulary mastery or not, this research focuses on how does Duolingo encourage learners vocabulary building and pronunciation into a more comprehensive learning environment? and what are the challenges faced by learners in vocabulary building and pronunciation using Duolingo?

2. LITERATURE REVIEW

The Importance of Vocabulary in Language Learning

Vocabulary is essential in language acquisition, as it plays a vital role in ensuring excellent and effective communication in any language [15]. In line with that Schmitt [16] states that vocabulary is a fundamental part that plays an active role in reading, writing, listening, and speaking skills. It develops learners' ability to express ideas from an early age [17]. Recent research has emphasized the importance of vocabulary mastery in language learning, especially among EFL learners of English as a Foreign Language, where a lack of knowledge of vocabulary will affect their understanding of the language, and this can cause them to have difficulty in developing other language skills such as listening, reading, writing, and communication [17] because lack of knowledge of vocabulary can cause EFL foreign language learners to experience excessive stress and worry so that this can lead to the growth of reluctance and decrease their liking and motivation in the language learning process carried out [18].

Pronunciation in Language Learning

A critical aspect of language learning is pronunciation. Leaner's habitual use of various resources influences their English mastery [19] [20]. Just as vocabulary is essential for effective communication, proper pronunciation ensures clear and comprehensible speech [21] . Research has emphasized the role of pronunciation in language acquisition, especially among English as a Foreign Language (EFL) learners [19]. Inadequate pronunciation can lead to stress and reduced motivation in the language-learning process for foreign language learners. Therefore, finding a suitable learning medium is essential to support the overall development of language skills and successful foreign language acquisition [22]. In conclusion, the importance of pronunciation in language learning cannot be overstated. As vocabulary is the foundation of effective communication, pronunciation ensures clarity and improves overall.

Gamification in Language Learning

Gamification is a term that refers to the integration of various game elements and mechanics into learning activities to increase engagement, motivate students, and create a more engaging and enjoyable learning experience [23]. Common game elements in learning gamification include a point system, challenges, player leaderboards, avatars, badges, rewards, story and game themes, instant feedback, and uniqueness and responsiveness. Gamification can also help by creating a learning scope that feels alive and fun so that learning by foreign language learners can feel more efficacious [24]. Gamification can be in the form of language learning-based applications such as Duolingo. This application provides a learning experience while playing simultaneously by focusing on vocabulary building and pronunciation for the learners [25], [26] [27].

Duolingo App

Duolingo is one of the most popular mobile apps today for learning foreign languages independently by applying a gamification or gaming approach [28]. This application focuses on helping foreign language learners learn language learning, including vocabulary building and pronunciation. This Duolingo application presents new vocabulary and pronunciation exercises with conversations in each game.[29], [30]. In addition, it is designed with a comfortable and straightforward appearance, making the Duolingo Application more fun than other learning applications [31].

Teaching with Medium

Teaching using medium can motivate student to understand faster because it appears something fun and challenging. The study about this has been taken to find how effective teaching ELT in school [32], [33], [34]. It is relation between the students and the high scores when the teacher allow them to explore what they like [35]. The play will not stop the students to learn something interested [36]. So the researchers think that Duolingo will give positive feedback for the students.

3. METHOD

This study uses a quantitative approach method by collecting research data using research instruments in the form of Likert Scale questionnaires to explore the use of Duolingo App in Vocabulary building and Pronunciation of Pre-service teachers, focusing on data collection through distributing questionnaires to pre-service teachers. The questionnaire will cover five main aspects: Accessibility, Usefulness of Learning through Duolingo, Entertainment level, and Effective Tool for Vocabulary. Data analysis will use a quantitative descriptive method to present the findings descriptively and provide an in-depth picture of the extent of the use of Duolingo application in vocabulary building and pronunciation. This research will provide an overview of the extent of the use of the Duolingo application specifically for vocabulary building and pronunciation. Relevant references for this research include recent research on the use of the Duolingo application to improve students' vocabulary and speaking skills [37], exploring pre-service teachers' perceptions of using Duolingo in teaching vocabulary [38], and the Duolingo method for application-based teaching [39].

Table 1. Demographics of Participants

Categories		Participant N=72	Percentage
Gender	Male	14	19,4%
	Female	58	80,6%
Semester	4	21	29,2%
	6	19	26,4%
	8	32	44,4%
Ever used Duolingo	Yes	63	87,5%
	No	9	12,5%

Table 1 above shows that of the 72 population in the study conducted, 87.5% or 63 pre-service teachers used the Duolingo application, and 12.5% or nine prospective teachers never used the Duolingo application for English language learning. The table above shows that the average user of the Duolingo application is dominated by female students, with a percentage of 80.6%, followed by male students, with as much as 19.4% only. The survey questionnaire in this study consisted of an open questionnaire where the questionnaire had a Likert scale with five points, namely 1). Strongly disagree 2). Disagree, 3) Neutral, 4). Agree and 5). Strongly Agree. The survey questionnaire aims to determine whether using the Duolingo App can help in vocabulary building and pronunciation of pre-service teachers with a survey processing time of approximately 10-15 minutes. The survey results were analyzed thematically according to the themes of the items divided into Accessibility, Entertainment level, the usefulness of learning through Duolingo, Effective Tool for Vocabulary, and Effective Tool for Pronunciation.

4. FINDINGS AND DISCUSSIONS

This section discusses five main aspects: the accessibility of Duolingo in supporting English language learning; the usefulness of learning through Duolingo, including its features; Entertainment Level, Duolingo as an effective tool for vocabulary; and Duolingo as a tool in language pronunciation. The research was conducted with 72 pre-service teachers at a private university in Jakarta.

Accessibility

The following table presents the research results on the accessibility of the Duolingo app in learning English vocabulary and pronunciation. The study involved 72 respondents who rated three main questions. The questions included the ease of accessing Duolingo at any time, interest in learning to use Duolingo because it facilitates understanding of English vocabulary, and the effectiveness of Duolingo in helping memorize vocabulary and pronunciation. Each respondent responded on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree), and the results were measured in mean and standard deviation (SD).

Table 2. Accessibility of Duolingo

NO	Question	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
1	Duolingo can be accessed anywhere and anytime to learn English Vocabulary and Pronunciation	72	2,8% 2	0% 0	4,2% 3	25% 18	68,1% 49	4.57	**0,82**
2	I'm interested in learning using Duolingo because it makes it easier for me to understand the meaning of English vocabulary properly	72	2,8% 2	2,8% 2	5,6% 4	45,8% 33	43,1% 31	4.22	**0,89**
3	Learning using Duolingo makes me memorize new vocabulary and helps me in pronunciation well	72	4,2% 3	0% 0	4,2% 3	51,4% 37	40,3% 29	4.22	**0,88**

The table above shows that most respondents perceive Duolingo as an accessible and helpful tool for learning English vocabulary and pronunciation. The high mean scores on each question suggest that respondents generally agree or strongly agree with the benefits provided by Duolingo. This result suggests that the app has significant potential for supporting English language learning, particularly regarding accessibility and learning efficiency.

The data in the accessibility section above with the statement "Learning using Duolingo makes me memorize new vocabulary and helps me in pronunciation well" shows positive results, which can be seen from 51.4% agree, 40.3% strongly agree. This result shows that most of the participants in the study agree and strongly agree with the statement. The present finding is congruent with the research conducted by Anderson [40], which indicates that most participants endorsed affirmative statements regarding the accessibility of Duolingo.

Usefulness of Duolingo

The data in the table below indicates that most respondents expressed positive views regarding using Duolingo. For instance, 52.8% of respondents strongly agreed that Duolingo is a useful tool for learning English, with a mean score of 4.40 and a standard deviation of 0.78. Furthermore, 37.5% of respondents indicated that the features in the Duolingo app assisted them in correcting their pronunciation mistakes, with a mean score of 4.22 and a standard deviation of 1.06. This data demonstrates that Duolingo is a useful tool that facilitates self-learning and pronunciation improvement.

Table 3. The usefulness of learning through Duolingo

NO	Question	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
4	Duolingo is a useful tool for learning English	72	1,4%	2,8%	1,4%	41,7%	52,8%	4.40	**0,78**
			1	2	1	30	38		
5	The features in the Duolingo app help me correct my pronunciation mistakes	72	6,9%	0%	5,6%	37,5%	50%	4.22	**1,06**
			5	0	4	27	36		
6	I enjoy the Duolingo App because it provides many practice conversations with new vocabulary	72	4,2%	1,4%	8,3%	34,7%	51,4%	4.28	**0,98**
			3	1	6	25	37		
7	Duolingo encourages me to learn English independently	72	4,2%	2,8%	5,6%	38,9%	48,6%	4.24	**0,99**
			3	2	4	28	35		
8	Duolingo allows me to practice my pronunciation and vocabulary building	72	2,8%	0%	8,3%	40,3%	48,6%	4.31	**0,85**
			2	0	6	29	35		

Based on the table, 50% participants strongly agreed with the statement "The features in the Duolingo app help me correct my pronunciation mistakes". As many as 37.5% of participants strongly agreed, 5.6% chose the neutral option, 6.9% strongly disagreed with the statement, and 0% disagreed. This data indicates that most participants consider the features in the Duolingo app to help them correct

their pronunciation mistakes while learning English. This finding is in line with [41]] research, which states that Duolingo provides feedback and corrections that assist learners in improving proper pronunciation.

Entertainment Level

The data below is divided into four questions, showing that most participants responded positively to each question statement with a mean value of 3.76% to 4.36%, with the largest score being 50% strongly agreeing with statement 12 and the smallest at 29.2% strongly agreeing with statement 10.

Table 4. Entertainment Level

No	Question	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
9	Learning English vocabulary and pronunciation on smartphone using duolingo is more fun than in the classroom	72	6,9%	5,6%	11,1%	41,7%	34,7%	3.83	**1,19**
			5	4	8	30	25		
10	Learning English with Duolingo gives a competitive learning atmosphere	72	5,6%	9,7%	12,5%	43,1%	29,2%	3.76	**1,14**
			4	7	9	31	21		
11	The Duolingo App offers diverse subjects and information, making it enjoyable and never bores users	72	6,9%	4,2%	9,7%	41,7%	37,5%	3.97	**1,13**
			5	3	7	30	27		
12	Duolingo English vocabulary questions are interesting and easy to understand	72	4,2%	0%	0%	45,8%	50%	4.36	**0,86**
			3	0	0	33	36		

This visualization provides a clearer picture of respondents' perceptions of Duolingo, which can be used to assess the entertainment level and effectiveness of the app in English language learning. Most participants, 43.1%, agreed with "Learning English with Duolingo gives a competitive learning atmosphere". 29.2% of participants even strongly agreed with this statement, while 12.5% chose the neutral option, 9.7% disagreed, and 5.6% strongly disagreed. This data indicates that most participants

think learning English using Duolingo creates a competitive learning atmosphere. This finding aligns with research [38], which states that language learning apps such as Duolingo can increase motivation and positive competition among learners. In addition, other studies conducted [42] also showed similar opinions regarding college-level students' perspectives on Duolingo providing a positive stimulus in their English learning.

In addition, there are 45.8% participants agreed with the statement "Duolingo English vocabulary questions are interesting and easy to understand". 50% of the participants strongly agreed with this statement, while only 4.2% strongly disagreed. No participants chose the neutral or disagree option with the statement. This data indicates that most participants found the English vocabulary questions in Duolingo interesting and easy to understand. This finding is supported by [43] research, which states that Duolingo offers interactive and fun vocabulary exercises for learners.

Effective tool for Vocabulary

Educational apps, such as Duolingo, have been demonstrated to be an effective tool for enhancing English vocabulary acquisition. The following survey is designed to ascertain the Duolingo app's impact in facilitating English vocabulary building.

Table 5. Duolingo Effective Tool for Vocabulary

No	Question	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
13	I believe my English vocabulary has evolved after using Duolingo	72	2,8%	1,4%	8,3%	54,2%	33,3%	4.14	**0,84**
			2	1	6	39	24		
14	Duolingo was able to give me a good stimulus in memorizing English vocabulary	72	4,2%	1,4%	12,5%	44,4%	37,5%	4.08	**0,98**
			3	1	9	32	27		
15	Duolingo is able to help me in improving my daily vocabulary	72	4,2%	0,0%	8,3%	43,1%	44,4%	4.22	**0.92**
			3	0	6	31	32		
16	Duolingo makes me more enthusiastic about memorising English Vocabulary, especially noun and verb	72	6,9%	2,8%	11,1%	38,9%	40,3%	4.01	**1,12**
			5	2	8	28	29		

The data revealed that participants considered that using Duolingo helped their English vocabulary learning process. The average score for the four questions ranged from 4.01 to 4.22, indicating that most participants agreed and strongly agreed with the existing statements. While the highest average score was 4. 22 with the statement "Duolingo can help me in improving my daily vocabulary" (Number 15), which shows positive perceptions, namely 44.4% strongly agree, 43.1 agree, 8.3% neutral, 4.25% disagree, and 0 disagree in number 13 gets 33.3% strongly agree, 54.2% agree, in item 14 gets 4. 08 with 37.5% strongly agree 44.4% agree. However, for item number 16, "Duolingo makes me more enthusiastic about memorizing English Vocabulary, especially noun and verbs", got the lowest average

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of 4.01, although 40.3% strongly agree, 38.9% agree, 11.1% neutral, 2.8% disagree, and 6.9% strongly disagree.

The above findings are similar to previous findings conducted by [14] which were designed to assess the effectiveness of Duolingo in facilitating vocabulary development. The results showed that most participants gave positive results, with 35% agreeing and 15% strongly agreeing. Furthermore, The findings of this data support other studies [44] that show the efficacy of Duolingo in helping students expand their vocabulary. Equally important findings have been found in other studies on Duolingo's ability to increase vocabulary and motivation in English [45].

Effective tool for Pronunciation

The table in the following section presents the results of research conducted on using the Duolingo application in learning pronunciation, with five statements covering various aspects regarding the benefits of Duolingo in learning English pronunciation.

Table 6. Effective Tool for Pronunciation

No	Question	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
17	Mobile App like Duolingo provides many opportunities to improve my pronunciation	72	4,2%	0%	5,6%	54,2%	36,1%	4.17	**0,87**
			3	0	4	39	26		
18	Duolingo can increase my motivation to learn English, especially in vocabulary and pronunciation	72	2,8%	2,8%	11,1%	48,6%	34,7%	4.10	**0,91**
			2	2	8	35	25		
19	I feel I can remember the pronunciation of words more easily using Duolingo Application	72	4,2%	4,2%	11,1%	37,5%	43,1%	4.10	**1,04**
			3	3	8	27	31		
20	Duolingo helped me understand the pronunciation of vocal and consonant sounds	72	1,4%	4,2%	9,7%	41,7%	43,1%	4.18	**0,89**
			1	3	7	30	31		
21	Duolingo is effective for learning more about the phonology of a language	72	0%	5,6%	13,9%	41,7%	38,9%	4.13	**0,86**
			0	4	10	30	28		

This data shows an interesting mean where two numbers, 18 and 19, have a mean of 4.10, with participants having a positive interest in using Duolingo to improve their pronunciation. Sections 17 and 20 have a mean that differs by one number, namely 4.17 and 4.18, wherein number 17 gets 90.3%

positive interest, 5.6% neutral, and 4.2% strongly disagree. In contrast, number 20 gets 84.8% positive value (Agree and strongly agree), 9.7% neutral, and 5.6% (Disagree and strongly disagree), and section 21 shows the lowest mean of 4. 13 where 38.9%, 41.7% agree, 13.9% neutral and 5.6% disagree, and 0% strongly disagree. The data above shows a positive value regarding the five statements above.

In addition, this visualization shows that most participants (41.7%) agreed with the statement "Duolingo helped me understand the pronunciation of vocal and consonant sounds", 43.1% strongly agreed, 13.9% were neutral, 5.6% disagreed, and none strongly disagreed. This data indicates that the majority of participants thought Duolingo helped them understand the pronunciation of vowel and consonant sounds in English. This finding is in line with the [46]] study, which revealed that participants positively assessed Duolingo's ability to help learn aspects of pronunciation, especially related to vowel and consonant sounds. Features such as pronunciation drills, feedback, and explanations on correct pronunciation were considered beneficial to participants in improving their understanding and pronunciation skills.

Moreover, based on the result of question number 21, the data shows 41.7% strongly agree and 38.9% strongly agree. The data generated aligns with the results of data conducted by Duolingo, which helps improve speaking skills. Research by [42], [47], [48] all showed a favorable impact of using the Duolingo app to improve English speaking skills.

4. CONCLUSION

Overall, the results of this study show a positive assessment from the participants towards using the Duolingo application to help them learn English, especially in terms of vocabulary building and pronunciation. The data presented through the pie chart revealed that most participants agreed that learning using Duolingo helped them remember new vocabulary, improve pronunciation, and correct their pronunciation mistakes while learning English. Furthermore, most participants considered that Duolingo creates a competitive learning atmosphere and presents interesting, easy-to-understand vocabulary questions. Another important finding was that Duolingo was effective in helping participants increase their daily vocabulary, foster enthusiasm in memorizing vocabulary, especially nouns and verbs, and understand the pronunciation of vowel and consonant sounds in English. In general, the features offered by Duolingo, such as pronunciation exercises, feedback, and explanations, were considered useful in improving the participants' English language skills.

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