




# Mobile Application for Supporting English Language Learning for the Deaf Students

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**Abstract.** Indonesia's digital education ecosystem has a wide range of control spaces, including geographical differences, gaps in infrastructure distribution, gaps in educators' digital capabilities, and gaps in different teaching methods. Thus, several scenarios or strategies must be used during the post-Covid 19 digital education transformation. In the learning process, learning strategies are needed based on the characteristics of students so that learning becomes effective and efficient. English is one of the languages used as a universal means of communication on an international scale. One of the most notable technological developments in recent years is the development of Duolingo smartphone app. This program incorporates the idea of "playing while learning" to make it more enjoyable and practical for deaf students to utilize when honing their vocabulary for vocabulary examinations. This research aims to determine the effect of Duolingo learning media on increasing the vocabulary of deaf students learning English in grade IX at SLB Sukabumi City. This research is quantitative. The research method used was a quasi-experiment with a pretest-posttest control group design. The population in this research was 36 deaf students in class IX at SLB Sukabumi City. Based on the results of the data analysis and the results of the hypotheses tested in this research, it can be seen that there was an increase in the vocabulary of deaf students in class IX at SLB Sukabumi City after using Duolingo learning media.

**Keywords:** Duolingo, English Language Teaching, The Deaf Students, Vocabulary.

## 1 Introduction

The COVID-19 pandemic has altered many facets of modern society, including education. Online learning is the experience of transmitting knowledge via the use of video, audio, graphics, text communication, software, and the internet network's assistance. This is a modification of information transmission via internet forums and digital technology developments as a trademark of the Industrial Revolution 4.0 to assist students with hearing loss in studying. Education is a priority to educate human resources in this life. Learning resources can be obtained from print media, books, or online, as the development of the world today. The adjustment of the development of science to the activities of students who are always struggling with technology must

be a consideration for elaborating on their daily pleasures. [1] states that the potential of human resources is needed to develop himself and the surrounding environment through education, and in the learning process he will learn about this technology. This statement explains that humans cannot be separated from the learning developments that will follow them, and it becomes an obligation to always adapt according to the progress of the times.

Technology has played a major role in every aspect of life. Technology can also be used to improve the quality of education. Recent technological advances, especially educational technology, have had a positive impact on the world of education. This new educational technology supports teaching and learning processes such as computers, smart phones, smart digital whiteboards, and others. With this technology, it is hoped that it can increase student engagement and motivation towards learning [2]. The rapid development of information and communication technology shows that the information and communication technology industry has very complex mobility. Therefore, it is important to understand the existence of various information and communication technology equipment, one of which is by knowing, using, and maintaining information and communication technology equipment so that they can be utilized to build each other's potential [3].

Language learning is part of education that aims to improve the ability to understand spoken and written languages, such as English. The English learning system is also very broad and extends to the use of the internet. [4] states that the contribution of new technology will hone the learner's ability to absorb a language, such as the use of memory in translation, databases, and the internet as a source of information. Technology also plays a role as a pedagogical medium for the benefit of gaining student autonomy, assessment, and collaborative learning. This statement implies that the role of technology has become very important in today's competitive era to develop one's knowledge and improve language skills.

One of the technologies that can be used to teach English to deaf students is the Duolingo smartphone application. Duolingo, which is a smartphone application aimed at iPhone and Android users. Duolingo was founded in 2012 for iPhone users, and its Android version was published on May 29, 2013, fast becoming the number one educational app on the Google Play Store for the first three weeks of its release. Duolingo provides a simplified English education approach based on everyday life. Despite the fact that it has only been in operation for around four years, Duolingo has been utilized by more than 100 million people globally and has achieved a rating of 4.7 out of 5 from more than eight million Android phone users. These findings support the notion that smartphone applications may be utilized to help students learn English, boost their motivation to study, and expand their knowledge in a more relaxed and fun manner [5].

Teachers who are facilitators in the classroom need to learn to use a variety of applications in order to adapt to change. When the pandemic occurred, a shift in the way of teaching and the media used in learning English developed with the use of technology in the form of applications that are capable of being solutions for the continuity of the learning and teaching process. Teacher skills in using technology are job demands that need to be developed and trained continuously so that teachers can

adapt to current situations in the world of education while helping students have knowledge and skills regarding technology and its use [6].

English teachers, who are one of the leading human resources in the process of improving students' abilities, can utilize technology to facilitate the fulfillment of their assignments, from preparation to learning evaluation. In the preparation process, the teacher can choose media or applications that suit the skills and needs of students in improving their English language skills. The role of communication and information technology is to facilitate the teacher's task of conveying information, knowledge, and skills that can solve problems. Learning can simultaneously help teachers and students achieve learning goals [7]. In addition, technology provides learning applications that are able to facilitate students' ability to learn independently and reflect on material that has been discussed at school [8].

Learning vocabulary in English is an important aspect of learning English for deaf students. [9] emphasizes that learning vocabulary in early childhood is the starting point for students learning a second language vocabulary in early childhood is the starting point for students learning a second language. In addition, early-age students will absorb vocabulary more than other aspects of language learning. In addition, vocabulary learning is an important aspect in the development of students' language skills [10]. Furthermore, [11] outlines 3 important aspects of learning foreign languages: pronunciation, vocabulary, and grammar.

In addition, several opinions state that language acquisition begins with vocabulary acquisition [12]. In an effort to acquire a second language, learning vocabulary has certain concepts that are different from learning other aspects. [13] revealed that learning vocabulary, especially in foreign languages, cannot be equated with learning vocabulary in the first language. In addition, learning English vocabulary also needs to be distinguished from learning the four English skills: speaking, listening, writing, and reading. Vocabulary knowledge must cover the dimensions of many aspects, such as pronunciation, auxiliary tools, collocations, aspects of meaning, and word formation.

Deaf children are children who experience a deficiency or loss of hearing ability either partially or completely due to the failure of some or all of their hearing devices, so they cannot use their hearing aids in everyday life. Deaf children experience hearing loss both in the womb and after birth. The cause of the hearing impairment experienced can be due to sensory abnormalities of the sensory organs, motor abnormalities, or neurological or sensory abnormalities [14].

Hearing loss experienced by deaf children will certainly have an impact on the development of language and speech. The ability of deaf children to speak is different from that of normal children in general. This is because the ability to speak is very closely related to the ability to hear. Because basically humans can speak due to their ability to hear voices in their environment, The fact that deaf children cannot hear makes it difficult for them to understand the language spoken by other people. They are unable to hear or catch some or all of the words spoken by others. They rely on their sense of sight to see the movement of their interlocutor's lips. So, they don't know how to pronounce the words, sentences, and rhythms correctly. As a result, they experience limitations in speaking verbally or orally.

Someone can communicate well and correctly with the surrounding environment if they can use words to make sentences that are complete and have meaning. Therefore, the requirement that must be met for good communication is mastering sufficient vocabulary so that it can be applied in communication. Words are elements of language that are spoken or written as a manifestation of the unity of feelings and thoughts in language. Words are units of language that have one meaning [15]. [16] states that words are the initial part, which is the main point for forming vocabulary.

The capacity to use words in communication is also tied to a person's command of his or her vocabulary. Vocabulary mastery, according to [17], is a person's capacity to perceive, grasp, and utilize words effectively and accurately through hearing, speaking, reading, and writing. Recognizing words entails learning new words by listening or reading. Vocabulary mastery is critical for acquiring language mastery; the more vocabulary a person possesses, the more ideas and concepts they can grasp.

Learning vocabulary and mastering it is an important aspect of learning English. According to [18] the vocabulary of a language is a set of rules that govern how it is structured. Vocabulary determines how the words are arranged in the form of language units that have meaning. Meanwhile, according to [19] vocabulary is all the words that are in someone's memory. If you learn English without mastering the vocabulary, it will be difficult for you to understand the intended words. Vocabulary is the basic key that students must have to master English skills. According to [20] the quality of a person's language skills depends on the quality and quantity of the vocabulary he has. The more vocabulary students have, the more ideas they master, so that they can easily convey and receive information clearly.

In normal children, the types of vocabulary that can be mastered by children aged 6–13 years, according to [21], include: 1) General vocabulary includes common words that are used by someone to communicate, namely verbs, nouns, adjectives, adverbs, conjunctions, and personal pronouns; 2) Special vocabulary includes special words that include certain things such as time vocabulary, color vocabulary, money vocabulary, secret vocabulary, popular vocabulary, and swear vocabulary.

In deaf children, the types of vocabulary studied include: 1) Concrete vocabulary is a set of words that can be more easily described using real-world imagery. As an example of this group of words, consider the names of objects and verbs, such as ducks, cows, trees, writing, reading, washing, and so on. [22] Abstract vocabulary is a group of words that are difficult to visualize with pictures or show with demonstrations. Examples of vocabulary included in the abstract group are vocabulary related to religion, moral attitudes, or manners. 3) Emotional vocabulary is a vocabulary that describes a person's emotional state. Emotional vocabulary is divided into two types: a) positive emotions, including happiness, self-esteem, self-efficacy, etc.; b) negative emotions, including sadness, anger, jealousy, anxiety, etc. [23].

Good language skills are influenced by the acceptance of vocabulary from the surrounding environment and affect language development that occurs in a person from childhood to adulthood. This is different from the problems that occur in deaf children, namely that deaf children experience dysfunctional hearing senses, so the vocabulary obtained from the surrounding environment is not as rich as that obtained by normal people in general. [24] explained the factors that influence the language

development of deaf children, including: 1) The process of maturation; in other words, the child is mature (sound and speech organs are already functioning) to speak words; 2) The learning process, which means that children who are mature enough to speak then learn other people's languages by imitating the words or phrases that they hear or pay attention to.

According to [25] deafness is a disorder or loss of hearing due to permanent damage that occurs in the cochlea, the inner ear. Inside, center, and outside. Someone who is deaf, especially if the deafness occurs from birth and does not get the right action, of course it will affect the development of his language because there are obstacles in the process of language acquisition. The importance of language learning needs and the barriers experienced by deaf children require appropriate ways to overcome them, and these methods have been raised by many special education institutions, both formal and non-formal. Special educational institutions that are often relied upon by parents of deaf children to guide the language learning process are special schools, which have various programs and ways of providing language learning.

Learning can help deaf youngsters develop language. The process of modifying behavior via experience is known as learning. The media is a tool that can aid in the learning process. To comprehend the role of the media in the process of providing learning experiences for students, consider that learning experiences can be obtained through the process of doing or experiencing what is learned, the process of observing and listening through specific media, or the process of listening through language [26].

Some general characteristics that are often found in deaf children According to [27] include: 1. Physically, the gait is stiff and slightly hunched over, the eye movements are fast and a bit violent, the movements of the legs and arms are very quick and agile, and the breathing is short and somewhat disturbed; 2. In terms of intelligence, it is difficult for deaf children to grasp abstract meanings because to be able to grasp abstract meanings requires a good understanding of spoken and written language; 3. In terms of emotion, the emotions of deaf children are always agitated, on the one hand because of the poverty of their language and, on the other hand, because of the outside influences they receive; In terms of social: feelings of inferiority, feelings of jealousy, and lack of sociability; 5. In terms of language, there is poor vocabulary, difficulty interpreting figurative language expressions, difficulty interpreting abstract words, and a lack of mastery of rhythm and style of language [28]

Duolingo is one of the application media that adheres to the mobile learning concept. [29] revealed that mobile learning is unique because users can access learning materials, directions, and matters related to learning, anytime and anywhere. Seeing application media that makes it easy to learn languages makes it possible to access English learning anywhere and anytime. Another concept implemented by Duolingo, namely playing while learning, can also be experienced when using the Duolingo application. Because the media has a position not only as a teaching aid but also as a way to motivate and communicate with students, it can be more effective. This is proven by the awarding of Google Play's Best of the Best 2013.

Duolingo, which aims to improve students' vocabulary mastery and increase their activeness during the English learning process, The Duolingo application is an

interesting medium for students learning foreign languages, especially English. According to [30], Duolingo application is an online learning program that makes it possible to take free language courses. The four skills involved in learning a language, such as reading, writing, listening, and speaking, are present during the learning process in Duolingo. Based on [31], it is stated that Duolingo is preferred over regular assignments because it is easy to use, useful, and fun. In the Duolingo application, there is a gamification technique that aims to attract students to increase their vocabulary through a game that is certainly more interesting and not boring. [32] argues that gamification techniques are faster and more intensive in learning experiences, and the use of game techniques makes activities more interesting and fun. By utilizing pictures and sounds that allow students to acquire a more realistic vocabulary. The Duolingo app gives students the possibility to repeat dialogues and phrases in order to achieve a clearer interpretation of what is communicated. According on the background information provided above, the following issues might be noted: How is the effect of Duolingo learning media on increasing the vocabulary of deaf students learning English in grade IX at SLB Sukabumi City?

## 2 Methods

This research is quantitative research. The research method used was a quasy experiment with a pretest–posttest control group design. According to [33] the quantitative research method is a type of research that is specific, systematic, planned, and clearly structured from the start to the creation of the research design. This research began with a pre-test (O1), which was given to the experimental class before being given treatment. Then the research process was carried out to provide treatment (X) using the Duolingo application for a certain period of time to deaf students according to their level of ability. After the treatment was given to deaf students, a test was given to measure their level of vocabulary comprehension. after being subjected to treatment (O2). In the test that will obtain data on the results of deaf students, it will be seen how far the ability to understand vocabulary in English for deaf students is whether increased or no change at all. Then compare O1 and O2 to determine how much difference there is, if any, as a result of the experimental variables being given. The population in this research were 36 deaf students in class IX at SLB Sukabumi City.

## 3 Results and Discussion

The following are the scores of the two variables obtained from the results of completing a test which consisted of 25 multiple choice questions conducted by 36 deaf students as the research sample. These two variables are the results of increasing student vocabulary before treatment and after treatment with the application of the Duolingo application learning media.

**Table 1.** Descriptive Data Analysis of Pretest Students' Vocabulary Comprehension Ability

Descriptive statistics	Results
Mean	46
Median	41
Mode	37
Maximum Score	81
Minimum Score	25

Based on the table above, it shows that the average pretest score is 46. There is median score 41, the highest score is 81, and the lowest score is 25.

**Table 2.** Descriptive Data Analysis of Posttest Students' Vocabulary Comprehension Ability

Descriptive statistics	Results
Mean	88
Median	91
Mode	91
Maximum Score	95
Minimum Score	61

Based on the table above, it shows that the average posttest score is 88. There is median score 91, the highest score is 95, and the lowest score is 61.

### Reliability Test

Reliability calculations were carried out using the formula proposed by Kuder Richardson with KR-20 or Split-Half obtained t count > t table then the overall question is declared reliability.

**Table 3.** Calculation of the Reliability of the questions

	Reliability Statistics	
	Part I	Value
Cronbach's Alpha	N of Items	8 <sup>a</sup>
	Value	827
	N of Items	7 <sup>b</sup>
	Total N of Items	16
Correlation Between Forms		847
Spearman-Brown Coefficient	Equal Length	918
	Unequal Length	918
Guttman Split-Half Coefficient		915

## Homogeneity Test

Homogeneity test is used to determine whether the variance of the pretest and posttest is homogeneous or not. To find out homogeneity seen from the results of student scores on the pretest and posttest. Significant level  $\alpha = 5\%$ . The homogeneity test used is the Levene test using the IBM SPSS Statistics 21 application. If the Significance value is  $> 0.05$ , the data variance can be the same or homogeneous. Meanwhile, if the significance is  $< 0.05$  then the variance of the data is not the same.

**Table 4.** Homogeneity Calculation Results

		Test of Homogeneity of Variance			
		Levene Statistic	df1	df2	Sig.
Student learning outcomes	Based on Mean	,340	1	49	,564
	Based on Median	,366	1	49	,550
	Based on Median and with adjusted df	,366	1	45	,550
	Based on trimmed mean	,455	1	49	,505

Based on the table above, it shows that the significance value is 0.505, which is greater than 0.05, so it can be concluded that the pretest and posttest have the same variance or  $H_0$  is accepted,  $H_a$  is rejected.

## Hypothesis Test

The hypothesis test used in this research is a statistical technique through t-test. Based on the results of the assumption test that has been carried out. It shows that the data is then used to test the hypothesis. Hypothesis test was carried out to find out whether or not there was an influence of the use of Duolingo learning media on increasing student vocabulary.  $H_0$  = There is no effect of Duolingo learning media on increasing deaf student vocabulary.  $H_a$  = There is an influence of Duolingo learning media on increasing deaf student vocabulary

**Table 5.** Hypothesis Test Results

Paired Samples Test	
t df Sig. (2-tailed)	
Paired Differences	



	94% Confidence Interval of the Difference Upper			
before being given treatment; after being given treatment	-33,472	-12,988	39,	000

Based on the table above, it can be seen that the significance value of sig.(2-tailed) is 0.000 so it is smaller than 0.05 and this means that there is an influence of Duolingo learning media in SLB Sukabumi City. **H<sub>0</sub>** is rejected and **H<sub>a</sub>** is accepted

## Discussion

This research aims to determine the effect of Duolingo learning media on increasing the vocabulary of deaf students learning English in grade IX at SLB Sukabumi City. This research is quantitative approach. The research method used was a quasi-experiment with a pretest-posttest control group design. The population in this research was 36 deaf students in class IX at SLB Sukabumi City. Before being given the treatment of the results of the pretest value, there was an average pretest score of 46, the highest value was 81 and the lowest value score 25. Meanwhile, after being treated using Duolingo, the posttest average score was 88, the highest score was 95 and the lowest score was 61. Thus, the average posttest score is higher than the pretest average score. In the homogeneity test using the Levene test, a significant score of 0.505 was obtained, which was greater than  $F_{table}$  0.05, thus the pretest and posttest had the same variance or  $H_0$  was accepted,  $H_a$  was rejected. While the results of the T-test researchers used the Paired Sample Test because they had the same research sample and in pairs. The results of the Paired Sample Test obtained a significant value (sig2-tailed) of 0.000 < 0.05, which means  $t_{count} < t_{table}$ , so  $H_0$  is accepted and  $H_a$  is rejected. Thus, there is an effect of the Duolingo application on increasing student vocabulary in learning English.

## 4 Conclusion

Based on the data that has been collected by the researchers shows that: Learning outcomes after the application of treatment (posttest) obtained an average = 88 and learning outcomes before treatment (pretest) obtained an average = 45. thus, indicating that there is an effect of learning applications Duolingo on increasing the vocabulary of deaf students in learning English in grade IX at SLB Sukabumi City. This is evidenced from the results of the hypothesis testing that has been carried out obtained  $t_{count} < t_{table}$  which is equal to 0.000 < 0.05, so the hypothesis in this study is accepted and successful.

Based on research experience using the Duolingo application to improve vocabulary in English for deaf children at SLB Sukabumi City, the following suggestions for several parties involved in this research are indicated for the development of the use of learning media: For schools, it is expected to develop the ability to use information

technology for students and teachers, with schools carrying out In House Training (IHT) at schools to improve the quality of teachers in learning to use information and communication technology. For teachers, with this research, the researchers hope to provide input to teachers as a variation of learning strategies so that it becomes an inspiration to further develop and utilize existing learning media, namely mobile learning. For deaf students, with research on the use of the Duolingo application, deaf students are expected to continue to practice positive use of information and communication technology in the learning process.

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