



DEVELOPING DIGITAL LEARNING APPLICATION AS A LEARNING MEDIA FOR DEAF STUDENTS IN LEARNING ENGLISH VOCABULARY

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ABSTRACT

This research aims to create digital-based English learning media tailored for deaf children. The study employs the ADDIE development model, which consists of Analysis, Design, Development, Implementation, and Evaluation. A needs analysis was conducted to assess the current challenges faced by deaf students in learning English through digital media. The findings highlight several key issues, including a shortage of qualified English teachers, reliance on text-based teaching materials, and an ineffective learning process due to the predominant use of textbooks, which are less suitable for visual learners like deaf students. Consequently, developing digital learning media is crucial. The learning media designed in this study is an Android-based digital application incorporating images, animations, and videos to create a more engaging learning experience, making it easier for both teachers and students to teach and understand English. The study's results indicate that the digital English learning media application effectively enhances students' comprehension of English.

Keywords: *Deaf Students, Digital Learning Media, Learning English, Development Research*

1. INTRODUCTION

Education plays a crucial role in advancing a nation's intellectual growth. Its significance is evident in the need for early childhood education. Every individual, including children with special needs, has the right to education. According to Law No. 20 of 2003, "Citizens with physical, emotional, mental, intellectual, and/or social disabilities have the right to receive special education." This regulation affirms that children with special needs are entitled to the same educational opportunities as other children (Rahman & Sulthoni, 2017).

One category of children with special needs is deaf students. Deafness is a general term used to describe individuals who have hearing impairments (Yusliana Bakti et al., 2021). The challenges faced by deaf children prevent them from exploring and producing sounds in their surroundings (Dan et al., 2020). As a result, they experience difficulties in communication and language learning due to limited vocabulary.

Vocabulary refers to a collection of meaningful words that an individual can use to express themselves in sentences (Alharthi, 2020; Nation, 2022; Dwipa et al., 2024). It serves as the foundation of effective communication; the more vocabulary a person possesses, the easier it is to speak clearly and accurately, ultimately influencing language quality (Rosyidah, 2021; Lesiana et al., 2023; Parhadjanovna, 2023). For deaf students, developing language skills is one of the key objectives of special education.

In addition to learning Indonesian, high school-level deaf students are also required to learn English. However, their limited English vocabulary poses a significant challenge in teaching the language. Observations reveal that this difficulty is compounded by the absence of expert English teachers, as most educators in special schools serve as general classroom teachers. Furthermore, conventional teaching methods and learning media

are ineffective in supporting deaf students' English learning.

With technological advancements, adapting to modern developments in science and information is essential, including in education. Educators must utilize technology to enhance the learning process. Digital learning media are particularly well-suited for deaf students, as they rely heavily on visual perception due to their hearing limitations. Digital learning materials incorporating images and videos can significantly aid their learning process. This aligns with the assertion that using audiovisual media benefits children with special needs by enhancing their understanding of lesson content (Parwoto, cited in Kholis & Kustiyono, 2020; Merta et al., 2023; Arta et al., 2023; Rakha, 2023; Suprayogi et al., 2024). Similarly, Setianingsih (2017) emphasized that deaf children rely more on their sense of sight to absorb information, making visual learning media essential while minimizing reliance on auditory methods.

Given these challenges, this study aims to develop a digital learning medium for English vocabulary tailored for deaf students. The research will be conducted in Senior High Schools for Deaf Students, specifically focusing on tenth-grade students.

2. LITERATURE REVIEW

English for Deaf Students

One of the elements that contribute to the success of schooling is language. This may result from the way that kids are taught both Indonesian and foreign languages, particularly English, in the classroom.

All children in schools, including those who are deaf and have special needs, are required to learn English. At least four learning objectives can be identified based on the SMALB Deaf class X English textbook description:

1. Raising the caliber of pupils
2. Develop your ability to communicate both orally and in writing to reach a functional literacy level.

3. Recognize the value and significance of English in boosting the country's competitiveness in the international arena.
4. Help pupils comprehend the connection between language and culture.

The goal of teaching English in schools is generally to lay the groundwork for language proficiency so that it may be used in everyday situations (Alwasilah cited in Suryanti, 2016).

Digital Learning Media

The field of education is closely intertwined with advancements in technology and information (Susanto et al., 2022; Sharma et al., 2019). As technology continues to evolve, learning technology is being increasingly utilized. Educators are expected to harness these technological developments to enhance the teaching and learning process. Consequently, teachers must possess the necessary skills to operate digital media effectively (Nucifera et al., 2022; Dash, 2022; Lukita et al., 2023). Media itself refers to tools that facilitate an activity or task (Sumakul et al., 2024).

Meanwhile, digital systems operate through computer or electronic mechanisms, eliminating the need for manual operation (Maisarah et al., 2022). Digital media is a form of technology managed and run by digital systems, which computers can read directly (Abdul & Arif, 2020; Prawiradilaga, 2025; Ajani et al., 2024). Thus, digital learning media refers to digital tools or platforms designed to support and simplify both technical and educational processes. Some examples of digital media commonly used in learning include PowerPoint, E-books, YouTube, Google Classroom, and Microsoft Word.

Compared to conventional learning media, digital learning media offer several advantages, such as: (1) increasing students' motivation to learn, (2) helping students stay more focused during lessons, (3) presenting materials in a more interactive and innovative way to reduce boredom, and (4) enhancing students' technological skills (Dewi & Korompis, 2023)

Digital Learning Media for Deaf Students

In Indonesia, English is considered a foreign language, not the primary language, yet it is still taught in schools, with most institutions requiring students to learn it. This includes students with special needs, such as deaf students, who face challenges in oral communication. Despite these difficulties, English is often a subject that contributes to graduation requirements at Special Education High Schools (SMALB), ensuring that children with special needs have the opportunity to compete alongside their peers without disabilities.

Deafness refers to partial or total hearing loss, which is often accompanied by communication challenges, social interaction difficulties, and emotional development issues—factors essential for children in building their social competencies (Mardhotillah & Desiningrum, 2020). Communication barriers, particularly in learning English, pose significant challenges, compounded by the fact that many teachers at Special Education Schools (SLB) are general classroom teachers who may not be fully equipped to teach English to deaf students.

One potential solution is for teachers to utilize learning media that caters specifically to the needs of deaf students. A common challenge for these students is their inability to grasp abstract concepts, which underscores the importance of visual learning media. By using visual aids, deaf students can engage with learning content through their sense of sight (Septiawati et al., 2021). Capitalizing on the advancements in technology, researchers are working to develop an Android-based digital learning application tailored for teaching English to deaf students.

3. METHODS

The research method used in this study is development research. Development research is a research methodology adopted by a researcher whose goal is the creation of new products and tools that are refined (Ibrahim, 2016). The development model that will be carried out is the ADDIE model. The

ADDIE development model consists of 5 steps: analysis, design, development, implementation, and evaluation (Almelhi, 2021; Mahesti et al., 2025). ADDIE's research design model can be seen in the image below:

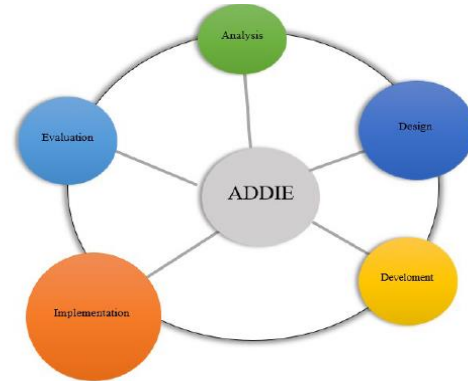


Figure 1. ADDIE Model (Allen, 2017)

The following is an explanation of the stages of the ADDIE research model:

1. Analysis

In this analysis stage, the researcher tries to analyze several necessary things before conducting the research.

- a) **Analysis of Learning Materials** The learning material will be adjusted to the curriculum that applies to deaf SMALB students in class X. This is very important considering that those who will use this application are students with special needs, so the content of this learning application must be on target.
- b) **Analysis of the Learning Environment** The researcher will directly observe the learning environment of class X deaf SMALB students to get an idea of how the learning environment is at school. Researchers will observe how intense and capable the students are in using technology such as cell phones and the internet. This is necessary to measure whether students can use the digital English learning application well later.
- c) **Student Needs Analysis** It is essential to analyze student needs to discover the problems faced in the teaching and learning process of English subjects. Researchers will conduct direct interviews with teachers and distribute

questionnaires to students to obtain this information.

- d) Level of Student Understanding The last stage of analysis is when the researcher will try to conduct a test on English learning materials for the students to determine their ability to learn English.

2. Design

In the program design stage, researchers will collaborate with software developers to create an English learning application tailored for deaf students. This application will be Android-based, allowing students to access it easily on their mobile devices. To develop the learning materials, researchers will work closely with tenth-grade teachers from SMALB for deaf students, ensuring that the content aligns with students' needs. One key feature of the application will be sign language videos to help students comprehend the lessons more effectively. In addition to these videos, engaging images will be incorporated to capture students' interest and boost their motivation to learn English. Researchers will source relevant image media from Google to enhance the visual appeal of the learning materials..

3. Development

At the development stage, several experts will validate some aspects of the application. The first is validating learning materials, which will validate whether English learning materials are appropriate. The second thing that the expert will validate is the media in the application, such as the features and usability of this application. The third is sign language validation, which will be carried out by sign language experts who are teachers from the school. Experts will provide an evaluation and assessment of the three aspects; if one of the three aspects still needs to meet the criteria, then revisions will be carried out based on the suggestions and opinions of experts. This digital learning application can be feasible and tested on SMALB students with special needs for people who are deaf or hard of hearing later.

4. Implementation

Implementation is the stage where this application is tested on deaf class X SMALB students to find out if this digital learning application is to the needs of deaf students in learning English and is effective in helping students and teachers in the teaching and learning process in the classroom.

5. Evaluation

The last stage is evaluation; at this stage, the researcher will evaluate the trial results from the implementation stage. Product improvement is carried out at this stage based on the data from the results of the tests. So that this application can really.

4. RESULTS AND DISCUSSION

Research is an activity carried out systematically to understand natural and human events so that new knowledge that helps solve a problem in life will be obtained (Herlinda et al., 2010). This research uses the development research method. According to van den Akker (1999), development research is a method a researcher adopts to create new, enhanced products and tools. This study uses the ADDIE development model, which consists of five steps: analysis, design, development, implementation, and evaluation (4). Furthermore, Branch (2009) mentioned that ADDIE is fundamental to creating adequate learning resources.

1. Analysis

The first stage in the ADDIE development model is analysis. This stage aims to obtain information about potential users of teaching materials to be developed. Some of the things that will be analyzed at this stage are learning materials, the learning environment, student needs, and student understanding.

Analysis of Learning Materials

The learning materials are analyzed so that the learning media to be developed is

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right on target in accordance with the curriculum applied to deaf children of SMALB class X. The following are the results of the learning analysis that has been carried out:

Table 1. Result of the Learning Analysis

Materials	Sub- Materials
Describing People, things, and Animal	Describing People : Describing Physical Appearance

Learning Environment Analysis

In the learning environment analysis stage, the researcher directly observed the learning environment of SMALB Deaf class X students. It was reassuring to see that the learning environment at SMALB Deaf Class X school is fully supportive of using digital learning media. A computer laboratory is used by students who follow IT skills; they are also quite proficient in using handheld devices such as mobile phones. In addition, the school provides a WIFI network that further supports the use of digital learning media.

**Figure 2. Learning Environment Analysis****Analysis of Student Comprehension Level**

The researcher will try to analyze the extent of the knowledge of deaf SMALB students in class X in English subjects. The analysis was conducted by testing English learning materials about part of the body vocabulary. The results are as follows:

Students' Understanding Level	Percentage				
	0-40	41-55	56-70	71-85	86-100
Very high					
High					
Average			10%		
Low		30%			
Very Low	60%				

Figure 3. The Result of Analysis Comprehension Level

From the data above, 60% of students are at a very low level, 30% are at a low level, and only 10% are at the average level. No students are at a high or very high level. This is predictable because, in addition to the students themselves who have difficulty knowing English, teachers also have difficulties teaching English subjects.

2. Design

After conducting the analysis stage, the next stage is design. Design the systematic development of learning specifications by using learning theory and learning to ensure the quality of learning. At this stage, the researcher collaborates with software developers to design an English vocabulary learning application. Students and teachers can later use this application to learn English for deaf SMALB students. The app can be used on Android-based devices.

For learning materials, the researcher will collaborate with class X deaf SMALB teachers and make sign language videos to insert into the application. In addition to sign language videos, images will be inserted into the application to help students learn and increase student motivation. The following is a prototype of the application made:

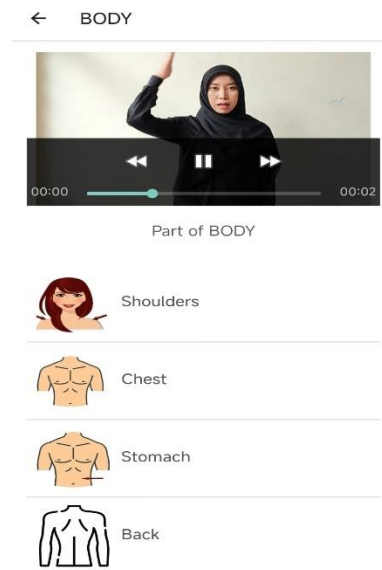
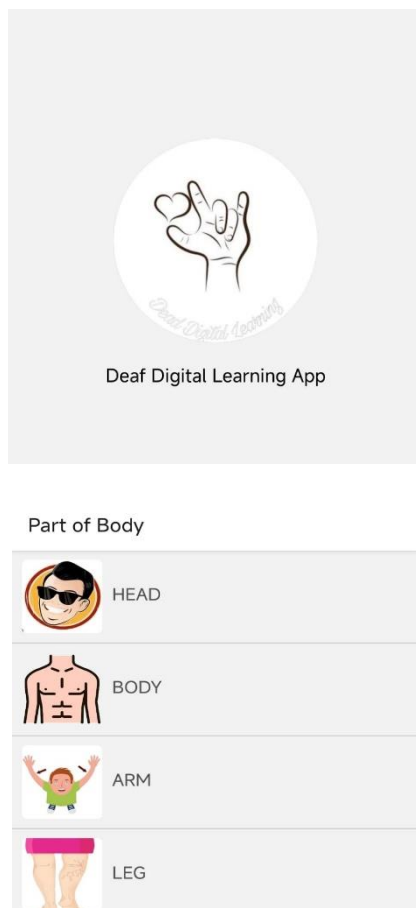


Figure 4. Design

3. Development

In this stage, several aspects of the application need to be validated by several experts. This is done so that the teaching materials are based on the characteristics of students and the development of the times (Ranuharja et al., 2021). The first is the aspect of learning materials; learning materials need to be validated so that they fit the needs of students. This application will be made specifically for students with special needs. The second thing that needs to be validated is the media used in the application, as well as the features and usefulness of the application. The third thing that needs to be validated is sign language, which will be done by a sign language expert, a senior teacher at the school. Experts will provide evaluation and assessment of these three aspects; if they do not meet the standards, the researcher will continue to revise so that later, this learning application can and is suitable for use by Class X deaf SMALB students.

In reviewing and validating the application, the experts were given a validation sheet as a questionnaire containing an assessment scale with blank spaces to write their comments. The scoring scale ranges from 1 to 5 according to their responses from "Strongly Disagree" to

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"Strongly Agree," consisting of 14 and 15 items. To determine the level of validity of a product, the average score of each validation sheet is calculated, and the results are interpreted by following the validity categorization. The product validity level results can be seen in the table below.

Table 2. Result of the Product Validity Level

No	Aspect	Average	Interpretation
1	Material	4,2	Very High Validity
2	Media	4,2	Very High Validity
3	Language	4,3	Very High Validity
Average		4,23	Very High Validity

It can be seen that in terms of material, an average score of 4.20 was obtained, which is included in the category of "Very High Validity." In terms of media, a total average score of 4.20 was obtained, which was included in the category of "Very High Validity." Then, in terms of language, a total average score of 4.30 was obtained, which was included in the category of "Very High Validity." It is known that an average score of 4.23 means the "Very High Validity" category. Thus, the digital applications developed are valid and fall into the category of very high validity.

4. Implementation

At the implementation stage, the application was tested on the students of SMALB Deaf Class X to determine whether it was suitable for deaf students learning English. In this phase, each student is individually given an application to use in learning. The following are the results of the application implementation.

Students' Understanding Level	Percentage				
	0-40	41-55	56-70	71-85	86-100
Very high					
High			20%		
Average	50%				
Low		30%			
Very Low					

Figure 5. The results of the application implementation

The data above show that 50% of students are at the average level, 30% are at the low level, and 20% are at the high level. Based on these results, digital learning media is influential in helping and improving students' ability to learn English.

5. Evaluation

The last stage is evaluation; at this stage, the researcher will evaluate the trial results from the implementation stage. Product improvement is carried out at this stage based on the data from the test results, so this application can really be suitable for use as a learning medium in the teaching and learning process in the classroom.

In this phase, each student is individually given an application to use in learning. After using and evaluating the product, each student is given a questionnaire to determine its feasibility. The following are the results of the application implementation questionnaire.

Table 3. The results of the application implementation questionnaire

Aspect	Average	Remarks
Conformity between content and student characteristics	4,3	High Validity
Content	4,5	High Validity
Effectiveness and Efficiency of Multimedia Use	4,6	High Validity
Evaluation	4,0	High Validity
Interactive Multimedia Appeal	4,3	High Validity
Quality of Media	4,6	High Validity
Average	4,3	High Validity

5. CONCLUSION

Based on the research findings, the development of digital learning media for deaf students in learning English is highly necessary. This study identifies several challenges, such as the lack of teachers with formal training in teaching English in special education schools and the continued reliance on textbook-based instructional materials, which are not suitable for deaf students who primarily rely on visual learning. Therefore, developing digital learning media, such as an Android-based application that integrates sign language videos and interactive images, serves as an effective solution to enhance deaf students' understanding of English.

The implications of this study suggest that integrating technology into education can significantly improve teaching effectiveness, especially for students with special needs. The use of visually based digital media, such as learning applications, e-books, and interactive dictionaries, can help deaf students grasp learning materials more easily and engagingly. Additionally, the findings of this study can serve as a reference for the development of educational technology in inclusive education, particularly in enhancing the accessibility of learning for students with special needs.

As recommendations, future research should focus on further development and testing of the digital learning application to enhance its functionality and effectiveness based on feedback from both teachers and students. Additionally, training programs for teachers in special education schools should be strengthened to ensure they are well-equipped to utilize digital learning media effectively. Future studies can also explore the development of digital learning media for other subjects to make education more inclusive and tailored to the needs of deaf students. Support from the government and educational institutions is crucial in providing resources and policies that promote the use of digital media in special education. By implementing these recommendations, English learning for deaf students can

become more effective, inclusive, and beneficial in improving their educational quality.

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