DEVELOPMENT OF INTERACTIVE SIGN LANGUAGE LEARNING VIDEOS TO IMPROVE INITIAL READING SKILLS

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Abstract

The purpose of national education as stated in Law Number 20 of 2003 is to develop the potential of students to become human beings of faith, piety, and noble character, as well as capable, creative, and independent. However, in practice, students with disabilities, especially deaf people, still face obstacles in obtaining equal educational services. This research aims to develop interactive learning video media based on sign language to improve the initial reading ability of deaf students. The method used is *Research and Development* with the ADDIE development model consisting of five stages: *Analysis, Design, Development, Implementation, and Evaluation*. This product was developed in first-class Indonesian subjects with body recognition materials, and tested by media experts, materials experts, and through field trials. The validation results showed that the product was declared very feasible by material experts (97.7%) and media experts (92%), and obtained high criteria for N gain results (0.81). The t-test results showed a significant increase from the pretest score (48.33) to the posttest (90.00) with a significance of 0.002. This product has a relationship between text-image-sign language in helping deaf students understand the meaning of each word to be more concrete. Thus, it can increase the mastery of basic vocabulary that underlies the initial foundation of initial reading.

Keywords: Interactive learning videos, sign language, early reading, deaf students

Abstrak

Tujuan pendidikan nasional sebagaimana tercantum dalam Undang-Undang Nomor 20 Tahun 2003 adalah untuk mengembangkan potensi siswa menjadi manusia yang beriman, taat, dan berkarakter mulia, serta mampu, kreatif, dan mandiri. Namun, dalam praktiknya, siswa penyandang disabilitas, khususnya tunarungu, masih menghadapi hambatan dalam memperoleh pelayanan pendidikan yang setara. Penelitian ini bertujuan untuk mengembangkan media video pembelajaran interaktif berbasis bahasa isyarat untuk meningkatkan kemampuan membaca awal siswa tunarungu. Metode yang digunakan adalah Penelitian dan Pengembangan dengan model pengembangan ADDIE yang terdiri dari lima tahapan: Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Produk ini dikembangkan dalam mata pelajaran Bahasa Indonesia kelas satu dengan materi pengenalan tubuh, dan diuji oleh ahli media, ahli materi, dan melalui uji lapangan. Hasil validasi menunjukkan bahwa produk tersebut dinyatakan sangat layak oleh para ahli materi (97,7%) dan ahli media (92%), serta memperoleh kriteria tinggi untuk hasil peningkatan N (0,81). Hasil uji-t menunjukkan peningkatan signifikan dari skor pretest (48,33) ke posttest (90,00) dengan signifikansi 0,002. Produk ini memiliki hubungan antara teks-gambar-bahasa isyarat dalam membantu siswa tunarungu memahami makna setiap kata secara lebih konkret. Dengan demikian, dapat meningkatkan penguasaan kosakata dasar yang mendasari fondasi awal membaca.

Kata kunci: Video pembelajaran interaktif, bahasa isyarat, membaca awal, siswa tunarungu

INTRODUCTION

According to Law Number 20 of 2003 concerning the National Education System, the purpose of national education is stated in Article 3 that the purpose of education is to develop the potential of students to become human beings who believe The purpose of national education as stated in Law Number 20 of 2003 is to develop the potential of students to become human beings of faith, piety, and noble character, as well as capable, creative, and independent. However, in practice, students with disabilities, especially deaf people, still face obstacles in obtaining equal educational services. This research aims to develop interactive learning video media based on sign language to improve the initial reading ability of deaf students. The method used is *Research and Development* with the ADDIE development model consisting of five stages: *Analysis, Design, Development, Implementation, and Evaluation*. This product was developed in first-class Indonesian subjects with body recognition materials, and tested by media experts, materials experts, and through field trials. The validation results showed that the product was declared very feasible by material experts (97.7%) and media experts (92%), and obtained high criteria for N gain results (0.81). The t-test results showed a significant increase from the pretest score (48.33) to the posttest (90.00) with a significance of 0.002. This product has a relationship between text-image-sign language in helping deaf students understand the meaning of each word to be more concrete. Thus, it can increase the mastery of basic vocabulary that underlies the initial foundation of initial reading.

The educational programs created have a very large possibility to be enjoyed by children who are categorized as normal. However, public schools still need a lot of improvement for children with disabilities to experience the program(Aprilia & Supriadi, 2019). Children with disabilities or children with special needs mean children who have obstacles and disorders(Purwanti & Perdana, 2024). This is because the characteristics they have are different from normal children in general. With its characteristics, children need special services that must be adapted to their abilities and potentials(Dermawan, 2018). The characteristics of children who need to be adjusted to educational needs include children with disabilities, the visually impaired, and deaf.

The purpose of education for deaf children is so that children can develop basic skills and knowledge as provisions in living daily life(Haliza et al., 2020b). Boothroyd predicts that problems that may occur due to deafness include: (1) communication and language, (2) social fields, (3) cognitive and intellectual fields, (4) perception, (5) emotional fields, (6) education, (7) job or vocational acquisition, and (8) problems for the community, especially the elderly(Arumsari, 2022). In the same vein, Hendarmin also stated that deaf people will have difficulty developing speaking skills, so they will overcome obstacles in communication that will have an impact on the development of their intelligence, personality, and appearance in socializing(Haliza et al., 2020a) One way to overcome the problem that occurs in deaf people is the ability to speak and communicate(Rahmah, 2018). Thus, it is hoped that deaf children can be integrated with society and can communicate verbally(Salsabila, 2022).

Movement is a movement of the limbs that has a meaning so that it is interpreted as a symbol (Nugraheni et al., 2023). For example, nodding your head means agreeing, raising both shoulders and hands means not knowing. These gestures are usually used as a form of communication (Gumelar et al., 2018). According to Wina Sanjaya, in order for the learning process to run smoothly and well, it is impossible for educators in teaching not to use media or teaching aids (Lugiati, 2020). Because by using learning media, the learning process becomes more interesting and students better understand what is conveyed by educators (Rosni, 2021).

Media is a means of learning as a means of communication and learning or in the form of teaching aids used to achieve learning goals (Wulandari et al., 2023) and the teaching and learning process can run efficiently and effectively (Sartika et al., 2020). Using interactive learning video media as a tool in teaching starting to read with sign language is one of the media that is very helpful for children in imitating the pronunciation of words that have been adjusted (Ratnasari et al., 2021). According to Pramudito, audiovisual media is a tool in conveying messages or subject matter that can stimulate students' abilities and minds in the learning processRahmah, "The Problem of Deaf Children and How to Overcome Them.".

By using this interactive learning video media, it is hoped that it can help and improve the ability of deaf students to learn, especially in starting to read, starting from knowing letters, syllables, words, and stringing letters into words so that children can imitate the words exemplified in the video (Vahini et al., 2022). In addition, children do not easily feel bored in receiving the material taught (Gunawan et al., 2017). By using this interactive video media, it is hoped that learning goals can be achieved according to expectations. What teachers need to do to make learning meaningful is to make various innovations in learning, so that there are various kinds of learning settings that can attract students' attention (Hakim & Windayana, 2016)

Based on the results of interviews conducted with deaf teachers in grade I at SKHN 1 Pandeglang, researchers found obstacles in learning, namely children still have difficulty reading, as evidenced by students who cannot string letters into syllables and words, this happens due to

several factors, namely deaf students have difficulty thinking abstractly and (. et al., 2019) Intellectual Intelligence They require repetitive repetition and visual media that can help children understand the material being presented (Devi, 2022).

Learning videos are a form of learning media in the form of videos that also contain words or sentences to develop students' memories of the material (R.Roro Rastrani Rahada Putri et al., 2022). Sign language learning videos can be developed as a learning medium for deaf students because students can use their sense of sight in understanding the message of the material in the learning video media (Tumanggor et al., 2023). The use of image media in the form of learning videos can help students in recognizing the shape of objects through the form of images and train students to be able to analyze and conclude so that students can understand the material presented (Anggraini et al., 2021).

METHODS

The type of research used in this study is the type of *Research and Development*. The development used is the development of interactive learning video media products based on grade 1 Indonesian subjects to get to know the members of the body (Ponza et al., 2018). Type *Research Research* is research to produce products and test the effectiveness of products (Purwanto & Rizki, 2015). The development model in this study is the ADDIE model, the selection of this model is based on the consideration that this model is systematically and programmatically arranged based on a theoretical foundation in a systematic sequence that suits the characteristics of the students. There are five stages in the ADDIE model, namely: a) *Analysis* b) *Design* c) *Development* d) *Implementation* e) *Evaluation* (Wisada et al., 2019).

The validation technique uses a likert scale questionnaire that will be given to two validators including media experts and material experts to obtain quality results in terms of content, language, and video presentation that matches sound and images. The subject of the field test in this study is class I SKhN 1 Pandeglang Academic Year 2024/2025. This trial stage was carried out twice with posttest and pretest trials. Data analysis in the study using descriptive statistics (Yuliani, 2018). Descriptive statistics are statistical methods used to analyze data by describing or presenting data as it is, without the intention of generalizing or drawing broadly applicable conclusions. In this study, descriptive statistics were applied through the presentation of data in the form of tables, calculations of average values, and percentages.

This study pays attention to ethical considerations with the consent of parents or guardians, and teachers in maintaining the anonymity and confidentiality of participant data, as well as ensuring that the entire research process is carried out safely and relevant to the needs of children with disabilities. The validity category of each aspect or all of the aspects assessed is determined based on the categorization criteria as shown in the following table.

Table 1. Validity Scale

Interval	Criteria
81% -100%	Very Valuable
61% - 80%	Worthy
42% - 60%	Quite Decent
21% - 60%	Not Eligible
<20%	Very Unworthy

Categories to analyze the effectiveness of improving student comprehension based on categorization criteria as shown in the following table:

Table 2. Normalized Reinforcement CriteriaMoh. Volunteers Irma, Tono Kus Indratno, and Suci Musvita Ayu, N-Gain vs Accumulation (Suryacahya, 2024).

Interval	Criteria
$0.70 > g < 100$	Tinngi
$0.30 < g < 0.70$	Storing
$0.00 < g < 0.30$	Low
$g = 0.00$	No Upgrade
$-1.00 < g < 00$	There is a decline

The number of samples in this study is relatively limited, so the results obtained cannot be generalized thoroughly. This limited sample is due to the criteria and availability of samples at the research site. Although the sample is small, it allows researchers to conduct a more in-depth analysis of each subject, which makes any variation of characteristics necessary to represent the population more comprehensively. Thus, the findings of this study need to be interpreted carefully and can be used as a basis for future research with a larger number of participants.

RESULTS AND DISCUSSION

Figure 1. Learning Activities in the Classroom

The results of the research in this study are examined in five aspects, namely 1) Video design, 2) Feasibility of product development based on expert validation, 3) Product development revision, 4) Prerequisite test for data analysis, and 5) Hypothesis test. At the video design stage, the development process used is the ADDIE model, because this model has structural and systematic stages. The ADDIE model has five stages, including: 1. Analysis Stage, at this stage of analysis there are three things that need to be analyzed, including: 1. Needs Analysis 2. Analysis of school facilities, and 3) Analysis of subjects. Stage 2. The Planning Stage, in the planning stage, consists of product design planning, determination of research schedules, determination of software to be used, and video script design to be developed. The software used in the development of this video is Canva, Capcut, Pinterest. 3. Development stage, in the development stage is the stage of compiling material that will be developed into videos using Canva and Capcut. Then 4. At this stage, media is applied to test the effectiveness of the media and the efficiency of the product in learning. This media is used to see the influence of interactive sign language videos on the initial reading ability of deaf students who will be measured using tests. 5) The last stage of the ADDIE model is evaluation, at this stage after all stages have been performed, evaluating formative and summative evaluations to determine their influence on learning outcomes.

The final product in this study is an interactive learning video of sign language to improve the initial reading ability of deaf students. This learning video product will be tested by several experts including learning media experts, learning material experts, and field trials. From this data, it will be presented according to the results obtained by each stage of the trial. After going through several stages in the development of learning videos, there are several things that need to be revised according to the comments and suggestions given by media experts and material experts so that the product can be used better.

Table 3. Validity Results

Trial Subject	Validity Result (%)	Information
Materials Expert	97,7%	Very Valuable
Media Members	92%	Very Valuable
N Advantages	0,81	Height

The media expert test was carried out by a lecturer majoring in Tarbiyah and teacher training at Sultan Maulana Hasanuddin University Banten, namely Dr. Purnama Rika Perdana M.Hum Based on the results of the assessment from media experts, after being converted with a conversion table, the percentage of achievement rate of 92% is at a very decent qualification, but there needs to be improvement based on the input and suggestions of media experts. The achievement of qualifications is very worthy of being influenced by several elements, including: a. Quality of the message b. Performance c. Language d. Images.

The expert test of learning materials was carried out by a lecturer of the Department of Tarbiyah and Teacher Training at Sultan Maulana Hasanuddin University Banten, namely Dr. Imas Mastoah, M.Pd Based on the results of the assessment from the metering expert, after being converted with a conversion table, the percentage of the achievement rate of 97.7% is at a very decent qualification, but there needs to be improvement based on the comments and suggestions given. The achievement of the qualification is very feasible to be influenced by several elements, including: a. Display Quality b. Software Engineering c. Material Curriculum d. Feasibility d. Cognitive Impact.

The test subjects in the field trial were all 1st grade students of SKh N 1 Pandeglang totaling 3 students. From this data, the gain value of N is 0.81 and this is at a high qualification which means that it is effective to use, so the developed media does not need to be revised.

Table 4. Normality Test

Normality Test

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	Df	Alone.	Statistics	Df	Alone.
Squirrels	,253	3	.	,964	3	,637
Post-Tests	,175	3	.	1,000	3	1,000

Before doing a hypothesis test (t-test), do a prerequisite test first (normality test). By conducting a normality test, the goal is to see if the data comes from a normal distribution or not. Where the result of the normality test is 0.637, then H0 is accepted so that the data is distributed normally. Then to test the effectiveness of learning video media, it was carried out with a test method.

This test was tested on 3 students to conduct a pretest and posttest, from the results of a t test and obtained an average pretest score of 48.33 and an average posttest score of 90.00. From these results, it can be concluded that there is a significant influence on initial reading ability, which can be seen from the results of the t paired sample test.

Table 5. T Test Results

Paired Sample Test

	Pairing Differences	t	Df	Sig. (2 tails)
	95% Confidence Interval of Difference			
	Top			
Couple 1 Pretest - Posttest	-34,496	-25,000	2	,002

Based on the results of problem identification, the results of the research obtained are 1) The development of this interactive sign language video was developed with the ADDIE model which is oriented to be compiled systematically based on the learning design, 2) This learning video was tested by material experts, media experts, and field tests with an average of good and excellent results, and 3) This interactive learning video media is said to be effective and has a significant effect on student learning outcomes resulting from the acquisition of t-test data. Thus, it is hoped that this learning video can be used further.

The integration of sign language in the learning process has a strong theoretical footing, especially when it is associated with visual learning and multimodal learning theory. As a form of communication that is gesture-based and visual-spatial, sign language is naturally aligned with the principles of visual learning that emphasize the importance of non-verbal representations in facilitating understanding. Through hand gestures and facial expressions, information is presented in concrete visual form, helping students connect concepts more clearly and directly.

Within the framework of multimodal learning theory, the use of sign language also enriches the information reception pathway. Sign language involves not only visual modalities, but also kinesthetic aspects through physical activity when generating or imitating signs. The activation of some of these modalities has been shown to improve retention and deepen information processing, as affirmed by learning experts who emphasize the importance of presenting material through various sensory channels.

In addition, the integration of sign language is also in line with the embodied cognition approach, which views that the thought process is inseparable from bodily activity. When students learn while performing gestures, they build stronger connections between concepts, motor experiences, and memory.

Thus, the use of sign language is not only an inclusive strategy for students with special needs, but also a pedagogical approach supported by modern learning theories. This approach enriches the learning experience and helps create a more interactive, adaptive, and meaningful learning environment.(Chong, 2025)

CONCLUSION

The design of interactive learning video media based on sign language was developed by following the stages of the ADDIE development model, which includes the stages of analysis, design, development, implementation, and evaluation. The learning videos developed are different from learning videos in general because they are equipped with sign language in accordance with the Indonesian Sign System (SIBI) and emphasize the element of character education. The material

presented in this video is about limbs, which are tailored to the needs of deaf students in grade I.

The feasibility of interactive learning video products was stated to be very good based on the results of validation from various parties, namely: Learning material experts with a validity result of 97.7% (very feasible), learning media experts with a validity result of 92% (very feasible), N gain results obtained involving grade I students of SKhN 1 Pandeglang 0.81 (High) Effective. The effectiveness of learning video media is proven through the results of statistical tests (t-tests) on students' pretest and posttest results. The average pretest score is 48.33, while the average posttest is 90.00. The results of the t-test showed a significance value of $0.002 < 0.05$, so there was a significant influence on the improvement of the initial reading ability of deaf students after using interactive learning video media based on sign language.

Further research is suggested to develop interactive learning video media based on sign language on more diverse materials, not limited to limb materials, but also include other themes that are in accordance with the curriculum of deaf students both at the junior and high grade levels. In addition, future research not only focuses on early reading ability, but may also test the influence of media use on other skills, such as writing, speaking, conceptual comprehension, and social skills of deaf students. The next research is also expected to involve a larger and more diverse number of respondents, both in terms of age, grade level, and school background, such as public and private schools, so that the research results obtained have a stronger level of validity and generalization.

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