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Teaching Phonics Through Video: Connecting Letter Sounds and Sign Language for Kinesthetic Children

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Abstract
This research aims to develop video learning to recognize vowel letters through sign language with an approach that is suitable for children with kinesthetic learning styles, who often experience difficulties in the traditional learning process. This research draws on multiple learning intelligences, particularly kinesthetic intelligence, which emphasizes that children learn best through physical activity. The research method follows the ADDIE model, which includes the steps of needs analysis, content design, video development, implementation, and evaluation, to ensure that the final product meets the criteria of effective learning. Based on unstructured interview data, teachers emphasized the importance of the specific features of letters. The implementation of this method was indicated to be successful, showing that 83.33% of students from groups A1 and A2 made significant progress in recognizing vowel letter sounds, with an average n-gain of 0.81 (A1) and 0.83 (A2). Although there were challenges for 20% of students in the speed of letter shape recognition and imitation, these results support the need for a diverse and inclusive approach to learning. The research recommends collaborative learning strategies for children who struggle with letter recognition and emphasizes the importance of using methods that support all learning styles. The

implications of the findings lie in developing more effective learning media, encouraging active and interactive learning that strengthens children's literacy and communication skills. The originality of this research lies in the integration of Indonesian letter sounds, the use of sign language and the learning steps of kinesthetic children. This research makes the subject matter more accessible to children with kinesthetic learning styles and makes a significant contribution to modern learning methodologies.

Keywords: Sign language; kinesthetic learning style; early childhood; video learning

Introduction

Children's learning process requires a diverse approach to accommodate different learning styles. One of the challenges in education is to adapt teaching methods to children's intelligences, as described in Howard Gardner's theory of multiple intelligences. Kinesthetic intelligence, which learns through physical activity, requires innovative approaches for children to absorb information effectively. The phonics method, which teaches the relationship between letters and sounds, has great potential to support children's literacy development. However, children with kinesthetic learning styles often struggle to understand phonics concepts through conventional methods, which can lead to misconceptions about their abilities.

Observation at M Kindergarten in Surabaya showed that out of 18 children, 8 were not able to read well. Children often misdistinguish vowels, and although they can read together, they struggle when asked to read alone. The use of letter recognition videos was not effective, and two children, FS and AN, could not recognize letters despite being active in motor activities. Observations at AW Kindergarten found FK children with similar features, who were also not interested in language learning. The learning traits of these children indicate kinesthetic intelligence, as described by Gardner. Traditional learning methods are not effective for them as they focus more on visual and auditory learning styles. Sign language, which is a visual way of communication, can be taught to children with kinesthetic learning styles to help them communicate and learn better.

Literature review

Kinesthetic learning, in educational psychology, is a learning style that involves physical activities to understand and retain information. Research shows that hands-on experience enhances cognitive development and understanding, particularly beneficial for children with learning disabilities, especially when teaching methods are tailored to their learning style (Cunningham and Bailey, 2021). Physical activity has also been shown to improve cognitive abilities and learning outcomes, supporting an active learning environment (Karasievych *et al*., 2021). In addition, expressive arts such as dance can enhance children's creativity and social skills (Hanna, 2014). Therefore, kinesthetic learning is an effective method that should be integrated into the curriculum to create an inclusive and effective learning environment.

Phonics development of Indonesian letters

Phonics teaching is a method that emphasizes the relationship between sounds and letters (Blevins, 2001). Research by the National Reading Panel (2000) shows that systematic phonics instruction improves reading and letter recognition skills. Juel (1996) found that children who received phonics intervention were better at recognizing words and processing text than those who did not.

The articulation of vowel sounds in Indonesian involves the process of sound production that utilizes the speech organs. Vowel sounds are produced when air from the lungs is

unobstructed, in a specific way for each vowel letter (Ariani and Djamahari, 2017). The development of letter sounds should consider the child's native language, which plays an important role in language learning. Research shows that learning letter sounds in the context of the mother tongue improves second language comprehension and acquisition (Vygotsky, 1978; Zhao et al., 2023). Dardjowidjojo (2000) states that attention to the mother tongue can increase motivation and reduce anxiety when learning a second language.

Longitudinal research by Anwar (2022) showed that students who received mother tongue support showed better linguistic development and communication skills. The integration of mother tongue-based learning accelerates the learning process and enriches students' experiences in a broader linguistic context.

Use of sign language

In Indonesia, inclusive schools that integrate students with hearing loss into regular classes are limited and exist only in big cities. Many schools are not ready with facilities and teachers lack understanding of the needs of inclusion children. University research on the effectiveness of sign language in learning is often limited to students aged 12-18 years, while studies for early childhood and primary school are hard to find

Research shows that interactive and relevant educational videos provide the best results in expanding vocabulary (Bintoro *et al*., 2023). The integration of Indonesian letter sign language videos combines visual, motion and audio elements, supporting children, especially with kinesthetic learning styles, in understanding and learning more effectively. Therefore, sign language video media is a useful strategy to improve language skills and enrich children's learning experiences.

Research method

Research design

This research used the ADDIE development model, which was chosen for its ease of understanding and systematic approach. This model consists of five stages:

- Analysis, to identify the problem and the appropriate product;
- Design, which involves planning the product;
- (iii) Development, to realize the design;
- (iv) Implementation, which tests the designed product; and
- (v) Evaluation, to assess the success of the developed product.

The ADDIE model is applied in the development of alphabet videos to improve early childhood letter recognition skills. Detail information regarding the method is explained elsewhere (Susilawati *et al*., 2025).

Subject of the research

The subjects of this research are 30 children from a kindergarten in Surabaya, aged 4-5 years. The subjects consist of 15 children from group A1 and 15 children from group A2. The research involves five kindergarten teachers to help refine the developed video product and to assess the feasibility of the sign language video for the sounds of the Indonesian letters.

Research instrument

The data collection method in this research uses observation, with instruments developed based on indicators of children's abilities to understand letter sounds and sign language.

Assessment is conducted through observation sheets utilizing a rating scale technique common in early childhood curriculum in Indonesia. To test the effectiveness of the video, the researcher also conducted open and unstructured interviews to obtain feedback. Data analysis is performed using qualitative descriptive analysis techniques based on the instrument framework for recognizing vowel sounds and sign language, as explained in Table 1 below.

Table 1. Instrument lattice for the ability to recognize vowel sounds and sign language

Assessment Area	Indicator	Measurement Method	Data Collection Tools
Voice Recognition	(i) Understand vowel sound imitation	Voice identification task assessment	Audio recordings
	(ii) Ability to produce vowel sounds	Pronunciation evaluation through guided activities	Audio/video recordings of responses
	(iii) Vowel sound differentiation	Comparative assessment of different letter sounds	Voice discrimination activity
Speed of sign language recognition	(i) Response time to Identification of vocal letter sign language	Time taken to identify sign language	Time records
	(ii) Fast recognition in the activity of vocal letter sign language recognition activity	Speed in recognizing vowel sign language during the activity	Interactive activity
	(iii) Accuracy of quick response to show vocal letter sign language	Evaluating correct responses in timed challenges	Portfolio
Engagement and Interaction	(i) Participation in video activities	Observational assessment of the engagement level of the video activity	Documentation record
	(ii) Child interaction and feedback	Observing the child's interaction during the video activity	Observation checklist
	(iii) Responsiveness to commands	Measuring the child's responses during the video activity	Teacher observation notes

Based on Table 1, the assessment areas consist of recognizing sounds and the speed of sign language recognition. Recognizing sounds, includes several indicators that assess children's abilities to understand and differentiate vowel sounds. According to research by Pressley and Graham (2010), under the category of recognizing sounds, there are several aspects being assessed, starting from the imitation of vowel sounds, which measures the child’s ability to accurately imitate the vowel sounds presented in the learning video, as well as their ability to produce vowel sounds, showing their understanding and recognition of those sounds. Furthermore, the differentiation of vowel sounds is also assessed by evaluating the children's capability to distinguish between different vowel sounds, which can be done by presenting paired sounds or similar-sounding letters and asking them to identify which sound the child hears. The speed of sign

language recognition, includes response time for identifying sign language for vowel sounds, which measures how quickly children can identify and respond to the sign language for vowel sounds presented to them.

In addition, evaluation is done on rapid recognition in contextual activities, which reflects the child's ability to recognize letter sounds during learning activities. In line with the findings by McGee and Boulton (2012) in considering the implementation of this method, several important factors should be considered, such as children's involvement in the activity, which is crucial to ensure that the learning experience is fun and engaging and encourages a positive learning environment. It is necessary to considering the use of both quantitative and qualitative evaluation methods to get a more complete picture of children's abilities.

By focusing on these two main areas in the context of Indonesian letter-sound sign language video activities in early childhood learning, especially kinesthetic children's learning styles, the instrument grid is simplified and adapted to the early childhood curriculum in Indonesia as shown in Table 2.

Table 2. Ability observation assessment grid according to Indonesian early childhood education curriculum standards

No	Component	Indicator	Observational Assessment			
			Score 4 = BSB (Developing very Well)	Score 3 = BSH (Developing According to Expectations)	Score 2 = MB (Starting to Develop)	Score 1 = BB (Not Yet Developing)
1	Sound recognition	The child can imitate the pronunciation of vowels.	Imitates all vowel sounds accurately and can do so confidently, even when asked to repeat them	Abble to accurately imitate most vowel sounds presented, demonstrating understanding of sound pronunciation	Abble to imitate some vowel sounds but often does so inaccurately or inconsistentl y	Cannot imitate any vowel sounds or show no interest in trying to pronounce them
2	Speed of recognition	The child can show the difference in vowel sounds	Distinguishes all vowel sounds presented quickly and accurately, showing quick recognition without hesitation	Consistently distinguishes most vowel sounds with minimal assistance, showing developing recognition skills.	Can distinguish some vowel sounds but requires significant help and assistance.	Cannot distinguish between vowel sounds and often confuses them (e.g., does not recognize any sound pairs)
3	Accuracy of imitation	Children recognize letter shapes through sign language	Recognizes and imitates all letter shapes in sign language with	Recognizes and accurately imitates most letter shapes in sign language,	Imitates some letter shapes in sign language, but	Does not show recognition or imitation of letter

			high accuracy and shows fluency in movements	showing clear understanding	accuracy is inconsistent; may confuse some shape	shapes using sign language
4	Rememberin g sequence	The child can show the sequence of sign language hand movements	Recalls and demonstrate complex hand gesture sequences in the correct order with ease, showing confidence and fluency	Can accurately recall and demonstrate most hand gestures in the correct order with few errors	Can remember and imitate simple sequences but often requirequeen ing and repetition	Unable to remember or imitate any sequence of hand gestures in sign language

Overall, Table 2 functions as a tool to measure children's development in the aspects of sound ability and sign language in accordance with the early childhood education curriculum in Indonesia. This assessment is based on clear and measurable criteria, making it easier for teachers to evaluate children's progress and provide constructive feedback.

Data was collected through open-ended interviews (as shown in Table 3) with five teachers to allow for in-depth exploration and flexibility, allowing teachers to express their opinions freely. The data obtained was then thematically analyzed to identify relevant patterns and categories, providing deeper insights into the teachers' practices and perceptions in this study.

Table 3. Open-ended interview instrument grids

No	Component	Indicator
1	Content Understanding	(i) What is your impression of the content of the Indonesian letter-sound sign language video material? (ii) In your opinion, has the presenter character conveyed the material well? (iii) Do you have any suggestions and criticisms of the Indonesian sign language video material?
2	Engagement	(i) In what aspects are you interested in the video content of Indonesian sign language letter sounds? (ii) Is there any part of the video material that makes you lose attention? (iii) Do you think the time duration of the video activities is sufficient for early childhood?
3	Visual and Aesthetic Elements	(i) In your opinion, does the appearance of the video content match the characteristics of early childhood? (ii) Are there any parts of the video images or animations that enhance or detract from the effectiveness of the video material? (iii) Are there any design elements (colors, fonts, graphics) that you find particularly effective or ineffective?
4	Accessibility and Usability	(i) Did you find the video activities easy to follow? (ii) Was there any confusing material or parts of the video? (iii) What do you think of the audio quality in the video? (iv) Did the quality of the audio in the video help or hinder your

		understanding?
5	Suggestions for Improvement	(i) What changes do you think could be made to improve the video materials or design? (ii) Are there any suggestions you would like to add?
|	Conclusion	(i) Overall, did the video help the teacher as a learning medium? (ii) Would you recommend this video to others? If not, why not?

Overall, Table 3 aims to build a deeper understanding of the effectiveness and relevance of learning videos from the teachers' perspective. Through open interviews, researchers can gather valuable qualitative information that helps identify areas of strength and weakness in the design and content of the videos, as well as their impact on teaching practices.

Results

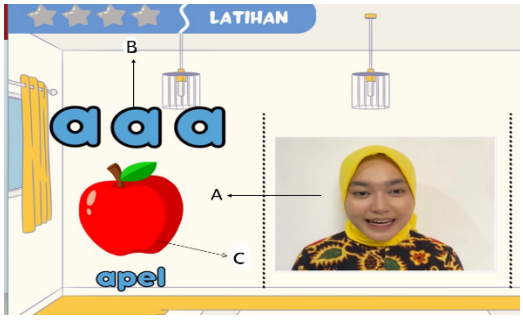
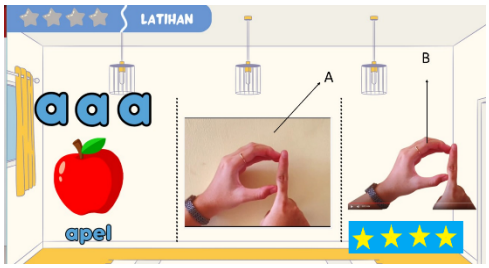
This learning video is designed to recognize vowel letters through sign language, with an approach that is suitable for kinesthetic learning style children. Its development is based on analyzing the needs and problems faced by children. The video design process involved eight stages:1) Establishing Content, the video is designed to appeal to children with kinesthetic learning styles and refers to early reading skills, showing the difference between letters and hand signals that resemble the actual letter shapesas shown in Figure1.

Figure 1. Vowel letter design of Indonesian language sounds

This, Figure 1 serves as a visual aid in teaching vowel letters in the Indonesian language, designed to capture children's attention and facilitate their understanding of the material being taught.2) Organizing the Research Procedure: This procedure directs learning activities through the application of videos. 3) Selecting the Presenter: The presenter should be active and cheerful to capture children's attention. 4) Audio Recording and Movement: Recording voice and using sign language gestures for vowel letters. 5) Creating the Video: Editing the video by incorporating animated images and mouth movements. The appearance of the video is shown in Table 4, which illustrates the structure and steps in the learning process using videos intended for children with kinesthetic learning styles. Below is an explanation of the contents of the Table 4.

Table 4. Indonesian letter sound sign language video design

Learning steps for kinesthetic children	Instrument/ Activity	Description

Challenge (interesting media)	(i) Presenter sounds the letters "a-apple" (ii) Animation of the letter "a" appears (iii) An animated picture of the object "apple" appears	
2. Listening	(i) Picture of a car Time limit for the child to sound out the letter. (ii) Assess the child's ability to sound out the letter "a"	
View Movement	(i) Display the sign language picture of the letter "a" (ii) The child follows the animation of the letter "a" sign language movement with the sound of Indonesian letters (iii) Assess the sign language movement of the letter "a"	

The video in Table 4 combines auditory, visual, and movement elements. This learning process aims to enhance understanding through hands-on experiences, focusing on active participation by the children. This kind of design can help children to more easily remember the letters and their sounds, as well as understand the use of sign language. 6) After the video is completed, the next step is to develop assessment instruments. The assessment instruments regarding the feasibility of this learning media are then consulted with media experts and subject matter experts for validation.

In the evaluation stage of the sign language research for normal children with kinesthetic learning styles, the researcher conducted an initial field trial. During the trial, no difficulties were encountered, although some children were still confused with the sounds of vowel letters. The teacher suggested enlarging the images of the presenter for clearer mouth shapes. This feedback encouraged the researcher to revise the product before proceeding with trials on groups A1 and A2 children. Below are the assessment results from 5 teachers as shown in Table 5.

Table 5. Assessment results by 5 teachers in using Indonesian letter sign language videos

No	Aspect Assessed	Percentage
1.	Ease of use	100%
2.	Video can increase children's interest and motivation when used in learning both individually and in class	100%
3.	Video can be used for individual learning by children	65%
4.	Suitability of sign language videos with Indonesian letter sound	65%
5.	Video can be used as teaching aids for teacher	85%
6.	Images are easy to see and imitate	65%
7.	The sound is clear	85%
8.	Challenges in the video make children active and cheerful	65%
9.	Sign Language is easy to see and imitate	85%
10.	The colors in the video are interesting and liked by children	100%

Based on the analysis of the data obtained from the assessment aspects of the learning video as shown in Table 5, the ease of use of the video achieved a perfect percentage of 100%, indicating that both teachers and children felt comfortable when using this media. In addition, the video also managed to increase children's interest and motivation during learning, both in individual and class settings, which also scored 100%. However, in terms of using it for individual learning, only 65% of respondents found it useful, as did the suitability of the sign language video to the sound of Indonesian letters and the clarity of the images that were easy to see and imitate. Meanwhile, higher scores in some other respects showed that the video can serve as a teaching aid for teachers with a percentage of 85%, and the clear sound also scored 85%.

The challenges presented in the video to make children active and cheerful scored 65%, indicating that despite the efforts to attract attention, there is still room for improvement. On the other hand, the aspects of sign language that is easy to see and imitate and colors that are attractive and liked by children scored 85% and 100%, respectively, indicating that the visual and interactive elements in the video are very effective in attracting children's interest. The results of this analysis illustrate that although there are some aspects that require further development, this learning video has great potential in supporting children's learning process. The results of the open-ended interviews with teachers provided input regarding the sign language of the letters ‘a’ and ‘i’. Tthe letter “ɑ” which is commonly used for the letter 'a' has a stem and the letter “i” there should be a dot. According to the teacher, these characteristics can distinguish the letter “l” which is similar. The percentage resulted in a value of 94%, then associated with the interpretation and entered the category 86-100 with a very valid assessment. It was declared valid because it reached a value of >70%. The validator then concluded that the product was suitable to be tested without revision.

The main field trial or carried out by taking a sample of control group data (A1) totaling 15 children, 1 child named MAF has kinesthetic learning style characteristics. The experimental group (A2) amounted to 15, there were 3 children who had kinesthetic characteristics named (DKS, MLV, IR). All children who have kinesthetic learning style characteristics are male. To determine the effectiveness of the product developed in the form of sign language videos of Indonesian letters, an analysis of the pretest and posttest assessments using a gain score was carried out. The results of the data analysis of the control group A1 will be explained in Table 6 as follows.

Table 6. Assessment of gain score of child A1

Name	Score				Gain Indeks	Category
	Pretest Score	Pretest %	Posttest Sc	Posttest %		
1. AFA	12	75	15	93.75	0,75	High
2. MAF	10	62.5	13	81.25	0,50	Medium
3. AEA	8	50	16	100	1	High
4. ADE	15	93.75	16	100	1	High
5. ANS	9	56.25	15	93.75	0,85	High
6. AYA	8	50	16	100	1	High
7. AKRA	11	68.75	15	93.75	0,80	High
8. ELSH	9	56.25	16	100	1	High
9. LRA	7	43.75	16	100	1	High
10. MKN	12	75	15	93.75	0,75	High
11. RHL	7	43.75	13	81.25	0,66	Medium
12. RHMA	10	62.5	16	100	1	High
13. SKLA	10	62.5	14	87.5	0,60	Medium
14. ZDLI	5	31.25	10	62.5	0,45	Medium
15. SLMA	4	25	8	50	0,33	Medium
Total					12,29	
Average					0,81	High

Based on Table 6, data on children's ability to recognize vowel letters using the Indonesian letter sign language video is obtained. The assessment of the results of the pretest and posttest increased after being given treatment in the form of sign language videos of Indonesian letters. This is indicated by the data on the acquisition of scores from 15 samples, there were 10 children who obtained a high category in recognizing vowel letters, while 5 children obtained a medium category, so that the level of effectiveness of Indonesian letter sign language videos in introducing vowel letters is included in the high category, which shows an average of 0.81.

Table 7 presents the results of the observations for group A1, which focuses on several assessment indicators in learning sign language and letter sounds. The assessment is conducted based on a scoring system that indicates the level of development of the children's abilities in various aspects. Below is an explanation of each component in the Table 7.

Table 7. Observation results of group A1

Asessment Indicator	Score 4 = BSB (Developing very Well)	Score 3 = BSH (Developing According to Expectations)	Score 2 = MB (Starting to Develop)	Score 1 = BB (Not Yet Developing)	Total Responses
Recognizing Sounds (Imitating Vowels)	80.00%	20.00%	-	-	100%
Recognition Speed (Differentiating Vowel Sounds)	73.33%	13.33%	6.67%	6.67%	100%
Accuracy of Imitation (Letter Shapes in Sign Language)	60.00%	33.33%	6.67%	-	100%

Remembering the Sequence (Hand Movements in Sign Language)	53.33%	33.33%	13.33%	-	100%

The observation results of group A1as shown in Table 7 can be concluded that 1) Recognizing Sounds: 80% of respondents were in the BSB category, showing excellent ability in imitating vowel sounds. This indicates that students have a strong foundation in recognizing sounds.2) Recognition Speed: 73.33% of respondents were in the BSB category, while 13.33% were in the BSH category. This shows that most students can differentiate vowel sounds well, although there is a slight challenge for some students in recognition speed. 3) Accuracy of Imitation: With 60% of students in the BSB category, and 33.33% in BSH, there is an indication that while most students are fairly accurate, there is room for improvement in imitating letter shapes in sign language. 4) Remembering the Sequence: Only 53.33% were in the BSB category, and 33.33% in BSH, explaining that this is an area of greater challenge, where only a few students showed excellent proficiency.

The results show that students showed good progress in speech recognition and speed of recognition, however there is a need for further improvement in accuracy and reminder of hand gestures in sign language. This can be a focus for future interventions and development of learning activities.

In addition to the trial mentioned above, there was a trial conducted with group A2, consisting of a sample of 15 children, as presented in the following Table 8

Table 8. Assessment of children's gain score A2

Name	Score				Gain Indeks	Category
	Pretest	*Pretest %*	*Posttest*	Posttest %		
1. DKS	9	56.25	15	93.75	0.85	High
2. RHM	10	62.5	15	93.75	0.83	High
3. TRL	8	50	16	100	1	High
4.RZ	13	81.25	16	100	1	High
5.WD	7	43.75	16	100	1	High
6.NR	9	56.25	14	87.5	0.71	High
7.KTK	8	50	15	93.75	0.87	High
8.YY	15	93.75	16	100	1	High
9.MLV	9	56.25	13	81.25	0.57	Medium
10.WS	12	75	16	100	1	High
11.IR	7	43.75	13	81.25	0.66	Medium
12.YS	10	62.5	16	100	1	High
13.NVL	7	43.75	14	87.5	0.77	High
14.NA	11	68.75	16	100	1	Medium
15.WJ	5	31.25	8	50	0.27	Low
		Total			12.53	
		Average			0.83	High

Based on Table 8 trials with group A2 on 15 samplesas shown in Table 8, data on children's

ability to recognize vowel letters using Indonesian letter sign language videos is obtained. Assessment of the pretest and posttest results has increased after being given treatment in the form of alphabet videos. This is indicated by data on the acquisition of scores from 15 samples, there are 11 children who get a high category in recognizing vowel letters, there are 3 children who get a medium category, and 1 child gets a low category so that the level of effectiveness of the alphabet video in introducing vowel letters is included in the high category, which shows an average of 0.83.

Table 9 presents the results of the observation for group A2, showing the assessment of several indicators of proficiency in sign language and vowel sounds. Each indicator is evaluated based on the percentage of respondents who achieve each category of development. Below are the data from the observation results.

Table 9. Observation results of group A2

Asessment Indicator	Score 4 = BSB (Developing very Well)	Score 3 = BSH (Developing According to Expectations)	Score 2 = MB (Starting to Develop)	Score 1 = BB (Not Yet Developing)	Total Responses
Recognizing Sounds (Imitating Vowels)	86.67%	6.67%	6.67%	-	100%
Recognition Speed (Differentiating Vowel Sounds)	73.33%	20.00%	6.67%	-	100%
Accuracy of Imitation (Letter Shapes in Sign Language)	46.67%	46.57%	6.67%	-	100%
Remembering the Sequence (Hand Movements in Sign Language)	66.67%	26.67%	6.67%	-	100%

The observation results of group A2 as shown in Table 9 stated that 1) Recognizing Sounds: 86.67% of respondents were in the BSB category, indicating that students were very capable of imitating vowel sounds. This indicates a strong foundation in the mastery of this important aspect of communication. 2) Recognition Speed: 73.33% of students are in the BSB category, while 20.00% are in the Developing as Expected category. This result shows that most students can differentiate vowel sounds well, although there are some students who may need improvement in sound recognition speed. 3) Accuracy of Imitation: 46.67% of students were in the BSB category, while the same proportion (46.67%) were in the BSH category. This shows that although there are some students showing good ability, many are still at an adequate level of development, signaling the need for improvement in the accuracy of letter shapes imitation in sign language. 4) Remembering the Sequence: Results showed 66.67% of students were in the BSB category, and 26.67% in the BSH category. This shows that many students can remember the sequence of hand movements well, but there are some who still need more attention in this regard.

The children's ability to recognize vowel letters has improved. This is evident from the observation results, where class A1 achieved a score of 0.81 and class A2 obtained a score of 0.80. Thus, it can be concluded that the n gain value falls within the range of $0.70 \leq g \leq 1.00$ and is

categorized as high.

Overall, the results in Table 10 show that the students have a good ability to recognize sounds and memory skills, but there is a need to improve accuracy in imitation and the recall of the sequence of movements in sign language. Below is the overall observation data.

Table 10. Overall total observation of group A1 and A2

Asessment Indicator	Score 4 = BSB (Developing very Well)	Score 3 = BSH (Developing According to Expectations)	Score 2 = MB (Starting to Develop)	Score 1 = BB (Not Yet Developing)	Total Responses
Recognizing Sounds (Imitating Vowels)	83.33%	13.33%	3.33%	0.00%	100%
Recognition Speed (Differentiating Vowel Sounds)	73.33%	16.67%	6.67%	3.33%	100%
Accuracy of Imitation (Letter Shapes in Sign Language)	53.33%	40.00%	6.67%	0.00%	100%
Remembering the Sequence (Hand Movements in Sign Language)	60.00%	30.00%	10.00%	0.00%	100%

Overall, Table 10 provides an overview of children's performance in four indicators of sound recognition skills: 1) Discriminating Vowel Sounds: 83.33% of the children are developing very well, while 16.66% are below the third score. Engaging activities such as music games are recommended to strengthen this skill. 2) Recognition Speed: 73.33% of the children excel in quickly recognizing vowel sounds, but 20% still face challenges. Timed activities and small group support are suggested to boost confidence. 3) Imitation Accuracy: 53.33% of the children are developing well in imitating letter shapes, but 40% are still in the "Developing as Expected" category. Hands-on practice and peer modeling can improve accuracy. 4) Remembering Sequences: 60% of the children are at the "Developing Very Well" level, while 30% are at the "Developing as Expected" level. Teachers need to provide exercises and feedback to assist children, using sequential learning strategies and visual and kinesthetic methods. Thus, this assessment indicates positive development but also identifies areas that require further attention.

Observations of three children with kinesthetic traits, namely DKS, MLV, and IR, who are part of groups A1 and A2, showed varied results. Child DKS made significant progress; although his hand movements did not match the sign language examples in the video, he demonstrated a good understanding. The pretest scores of the three kinesthetic children were below average (56.25%), but they improved rapidly to reach 93.75% in the post-test. The gain index of 0.85 indicates a strong improvement in DKS's abilities, placing him in the high category. This shows that DKS is very responsive to learning that involves physical and kinesthetic activities, in line with his learning style.

Meanwhile, MLV showed lower results compared to DKS. The pretest score was 56.25%, and the posttest score increased to 81.25%. However, with a gain index of 0.57, MLV falls into the moderate category. This indicates that although MLV can learn and develop with the

applied kinesthetic methods, there are still certain indicators that require improvement to achieve more optimal results.

IR had the lowest pretest score among the three children, which was 7 (43.75%). However, he managed to achieve a higher posttest score of 13 (81.25%). The gain index of 0.66 indicates a fairly good development, although it still falls into the moderate category. Like MLV, IR deserves appreciation for showing improvement, but he needs a more specialized approach to optimize his learning capabilities.

The assessment data shows the children can perform well across all evaluated indicators, particularly in recognizing sounds and differentiating vowels. Development is needed in areas such as accuracy in mimicking and recalling movement sequences. The presence of children who are still in the process of developing these skills indicates the need for tailored teaching strategies and additional support for those scoring lower.

By focusing on engaging and varied teaching approaches that meet the individual learning styles of students, teachers can further enhance students' proficiency in letter recognition learning.

Discussion

The video evaluation process in this study showed that the video had met the expected standards to improve students' understanding of sign language. This theory is in line with Vygotsky's opinion (1978) which states that social interaction and the use of aids in learning play an important role in the formation of children's cognitive skills. The Indonesian letter-sound sign language video is designed to integrate three learning styles: visual, auditory and kinesthetic, with a focus on vowel sound recognition. Using a phonics approach, the video presents letter pronunciation as well as hand gestures for sign language, in line with Gardner's (1983) theory of multiple intelligences, which recognizes the diversity of children's learning tendencies (Hafizah *et al*., 2024). A multisensory approach to learning improves understanding and retention of information, strengthening neurological connections (Stein *et al*., 2020). Teaching that involves a variety of learning styles improves engagement and learning outcomes, supporting the principle that active and diverse learning is more effective (Wen, 2021). The activities in this study encourage children to see, hear and act, which is effective in improving student engagement and understanding.

The results showed that many children made significant progress in recognizing vowel sounds after using this learning video. The data showed that 83.33% of students from groups A1 and A2 showed excellent progress in recognizing vowel sounds, with a high average n-gain (0.81 for A1 and 0.83 for A2). This finding is in line with research by Rachmawati and Duhda (2020) which shows that the use of visual media in phonics learning can have a positive impact on student understanding. Kinesthetic children's abilities also showed good progress after learning, with DKS being the most prominent in improving his abilities. Although MLV and IR showed significant progress, they are in the moderate improvement category and require more attention. A more interactive and active approach to learning seems to be helpful for these children, reflecting their kinesthetic type of learning style. Therefore, implementing more teaching methods that prioritize hands-on experience, and physical activities may further improve their understanding and skills in the future. This suggests that engaging and interactive learning videos can serve as a powerful motivator for children, helping them to interact more easily with the subject matter.

This research emphasizes the importance of varied and engaging teaching strategies to meet individual learning needs. With inclusive learning methods, all children are expected to utilize this medium. The focus on an affirmative approach to all learning styles helps students

develop skills, phonemic awareness and communication abilities. Further research is needed to better understand the use of learning media that includes all learning styles and its impact on children's development, not only for vowel letter recognition, but also for building a foundation of early reading skills. Finally, this study adds new information and suggestions regarding current issues in language education, as reported elsewhere (Haristiani and Rifa'i, 2020; Haristiani and Rifai, 2021; Fatawi *et al*., 2024; Luckyardi *et al*., 2024a; Farida *et al*., 2024; Luckyardi *et al*., 2024b; Medani and Sakti, 2022; Saadu, 2023; Damayanti and Santosa, 2024; Abidin *et al*., 2021; Shaturaev and Khamitovna, 2023; Jamiu, 2023a; Oya, 2024; Nadtayay and Wongsaphan, 2025; Kurniawati, 2022; Jamiu, 2022; Jamiu, 2023b; Sanni, 2023; Abduh et al., 2023; Husnia et al., 2023; Ibrahim et al., 2023; Suparto et al., 2023; Masbara et al., 2024; Akbar et al., 2023; Asrianti et al., 2022).

Conclusion

The conclusion of this research shows that the development of video learning to recognize vowel letters through sign language is a feasible and effective method to support the learning process of children aged 4-5 years. The video successfully integrates three learning styles: visual, auditory, and kinesthetic, which provides a holistic and fun learning experience for children. The results of the field trial show that the use of this video can significantly improve children's ability to recognize vowel sounds, with 83.33% of students showing good progress after using this media.

Although most students showed progress, there were still challenges that needed to be overcome, especially in the speed of recognition and accuracy of imitating letter shapes in sign language. Therefore, additional strategies, such as collaborative learning and engaging activities, are needed to support students who have difficulties. The implications of this study underscore the importance of varied and inclusive learning approaches, which not only cater to individual learning needs but also contribute to the development of children's basic skills, phonemic awareness and communication.

Declaration of conflicting interest
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