

Design of Early Childhood Learning Media on Plant and Animal Life Using Digital Puppetry

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Abstrak

Video pembelajaran boneka hewan ini berfungsi sebagai alternatif yang menarik untuk menyampaikan materi pendidikan kepada anak-anak. Video pembelajaran boneka hewan dapat merangsang imajinasi dan kreativitas anak-anak. Karakter-karakter hewan yang ada dalam dunia boneka mendorong anak-anak untuk berpikir lebih luas dan melihat dunia dari sudut pandang baru. Dalam video instruksional ini, penulis menggunakan metode penelitian seperti observasi dan wawancara, di mana penulis secara langsung mengunjungi Taman Kanak-kanak Dharma Pertiwi untuk melakukan wawancara dengan kepala sekolah. Metode wawancara tersebut melibatkan pengajuan beberapa pertanyaan mengenai materi pelajaran serta proses belajar-mengajar bagi anak-anak di Taman Kanak-kanak Dharma Pertiwi. Selain itu, pengamatan dilakukan dengan menelaah literatur, bahan ajar, kurikulum, serta cara guru mengajarkan anak-anak tentang alam. Proses pembuatan video instruksional ini melibatkan pemanfaatan boneka dan media digital, yang dikemas secara apik menggunakan aplikasi Adobe Premiere Pro 2020, serta pengambilan gambar menggunakan kamera mirrorless Lumix G7. Hasilnya, video instruksional ini berhasil diproduksi, dan hasilnya semakin diperkuat melalui kuesioner yang mengevaluasi efektivitas video instruksional tersebut terhadap anak-anak di Taman Kanak-kanak Dharma Pertiwi, yang menunjukkan hasil positif bagi media instruksional tersebut.

Kata kunci— Pertunjukan Boneka Digital, Pendidikan Anak Usia Dini, Media Pembelajaran, Video Pendidikan, Kehidupan Tumbuhan dan Hewan

Abstract

This animal puppetry learning video serves as an interesting alternative to convey educational material to children. Animal puppetry learning videos can stimulate children's imagination and creativity. The animal characters that exist in the puppetry world encourage children to think more broadly and see the world from a new perspective. In this instructional video, the author employed research methods such as observation and interviews, where the author directly visited Dharma Pertiwi Kindergarten to conduct an interview with the headmaster. The interview method involved asking several questions regarding the subject matter and the process of teaching and learning for children at Dharma Pertiwi Kindergarten. Additionally, observations were made by examining literature, materials, curriculum, and how teachers teach children about nature. The process of creating this instructional video involved utilizing puppetry and digital media, skillfully packaged using the Adobe Premiere Pro 2020 application, along with filming using a Lumix G7 mirrorless camera. Consequently, this instructional video was produced, and the results were further enhanced by a questionnaire,

which evaluated the effectiveness of the instructional video on the children of Dharma Pertiwi Kindergarten, demonstrating positive outcomes for the instructional media.

Keywords— *Digital Puppetry, Early Childhood Education, Learning Media, Educational Video, Plant and Animal Life*

1. INTRODUCTION

Education is an organized, planned, and lifelong continuous effort to develop learners into holistic, mature, and cultured human beings. To achieve this development, educational principles must be oriented toward developing all aspects of the learners, namely the cognitive and affective aspects, along with their implications for the psychomotor aspect [1].

According to Law No. 20 of 2003 concerning the National Education System, education is defined as a conscious and planned effort to create a learning atmosphere and process so that students actively develop their potential to attain religious spiritual strength, self-control, personality, intelligence, noble character, and the skills necessary for themselves, society, the nation, and the State.

Education is constantly progressing. Teachers are also required to be creative and innovative in developing learning media to create an enjoyable learning experience to achieve pre-determined learning objectives. Generally speaking, learning media itself is a supporting tool in the teaching and learning process.

Learning media constitutes a highly critical component in education. The presence of learning media can stimulate students' thoughts, feelings, and abilities, as well as encourage the initiation of the learning process within them. The creative use of media will increase the likelihood of students learning more, thoroughly understanding what they study, and improving their performance in executing skills in accordance with learning objectives [2]. Furthermore, the presence of learning media can also shape the character of learners [3].

The word media originates from the Latin word *medius*, which literally means "middle", "intermediary", or "messenger". In Arabic, media denotes an intermediary or a carrier of messages from the sender to the receiver. The AECT (Association for Educational Communications and Technology) also proposes this boundary, defining media as any form and channel used to convey message content or information [4].

Suryani and Agung state that learning media refers to the media used in the teaching and learning process, encompassing teachers' instructional tools as well as means of carrying information or messages from the learning source to the recipient (the learner) [5]. Meanwhile, according to Ummysalam (2017:9), learning media is an intermediary used by educators to transmit messages or information to learners so that students are stimulated when participating in learning activities. It can also be said that learning media facilitates learners in absorbing the lessons delivered by the teacher [6].

According to Ambiyar (2016:18), the general criteria that need to be considered include: (1) learning objectives, (2) alignment with the material, (3) student characteristics, (4) student learning styles (auditory, visual, and kinesthetic), (5) environment, and (6) availability of supporting facilities [7]. Meanwhile, the specific criteria to consider when selecting media are: (1) is the material important and useful for students?, (2) can it attract students' interest in learning?, (3) is it directly related to the learning objectives?, (4) how is the presentation format organized?, (5) is the material up-to-date and authentic?, (6) is the concept of accuracy clearly guaranteed?, (7) do the content and presentation meet standards?, (8) is the presentation objective?, (9) do the materials meet technical quality standards?, and (10) has the material undergone testing or validation?

The development of digital puppet media falls under audio-visual media because it

features replica images of puppet characters, and the audio used is the teacher's voice storytelling like a puppeteer (dalang). This media utilizes puppet replicas in the form of cartoon illustrations and is used to enhance learners' understanding of fable materials [8]. Moreover, when viewed from the philosophy of education, educational concepts must align with the philosophy of progressivism, which adapts to the times [3]. Therefore, the development of learning media related to innovation has become a necessity today [3].

Digital puppetry is a new innovation in education and can be utilized as an engaging and enjoyable learning medium. Teachers have begun creating new media to support learning and instructional success so that it is well-received by learners [8].

Puppets consist of cardboard cutouts attached to sticks or wooden handles. Their movement is limited to actions from one place to another while telling a story. The simplicity of making and playing these puppets makes them easily adaptable for use in elementary schools (Sudjana, 2015:190).

According to Mutoharoh et al. (2015:3), puppets as a medium serve an appropriate function when used in storytelling activities because they can introduce learners to abstract concepts, such as understanding a story. Puppet can provide direct experiences to learners and involve the five senses in storytelling activities. On the other hand, Nurcahyanto (2016:1) suggests that cartoon puppet media consists of puppets modified according to the required characters. Educators use cartoon puppets to capture the attention of learners in the classroom, and this medium was initially used by educators to tell a story.

According to Susanto (2015:242), Indonesian language learning in elementary schools is inseparable from four language skills: listening, writing, speaking, and reading [9]. Children's language skills are highly essential. Within a society, humans use language as a medium to interact and communicate with others, both through spoken and written forms. The language skills demonstrated by humans through listening, speaking, reading, and writing employ a large vocabulary, which constitutes an intellectual activity—the brainwork of an educated person. We know that human language ability is not an instinct and is not innate from birth; rather, humans learn language until they proficiently master it and can fulfill communication needs. Language skills are vital for conveying various thoughts and ideas [3]. In Indonesian language learning at the elementary school level, there are many materials covering stories, one of which is the fable.

According to Sucipto (2014:2), a fable is a type of folktale with animals as the main characters. These characters can think, feel, speak, express themselves, and interact like humans. Fables are didactic or educational, and a message or moral lesson is embedded within every story [10].

According to Winarni in Syafutri and Hidayati (2016:128), a fable is a story that depicts human character and morals, with the roles played by animals [11]. Meanwhile, Sugihastuti in Syafutri and Hidayati (2016:128) also states that a fable is a literary work or a literary text. Through animal characters in fable texts, the author intends to influence readers to emulate good characters and avoid emulating bad ones.

The development of digital puppet media falls under audio-visual media because it features replica images of cartoon characters, and the audio used is the teacher's voice storytelling like a puppeteer using fable puppets and using puppet replicas in the form of cartoon drawings. This media is used to improve learners' understanding of fable materials [8].

Fable puppets as teaching aids play an important role in learning, especially in explaining the sequence of content, story materials, or meaningful content. The power of fable puppets to influence learners' thinking lies in the serious attention that can be aroused through the images of the story characters demonstrated like puppets. Fable puppetry is a source of information that can be easily digested with strong visual effects. Learners will be more interested in watching fable puppets to gain information from the objects they need rather than having to read or listen. Cartoon puppets provide an emotional impact, enabling students to

respond to the presented material. The use of cartoon puppets in learning media fosters learning interest and student motivation to understand what is delivered by the teacher. This indicates that cartoon puppets can serve as a learning tool to motivate students to think effectively and efficiently [12].

The use of cartoon puppet media in fable story materials can help learners concretize story content through the depiction of story characters illustrated in the form of cartoon puppets, thereby allowing learners to better understand the story content. Cartoon puppet media is an alternative medium that can be used to deliver the content of fable stories so that it can generate an attraction for students. Using cartoon puppet media can help learners reason, imagine, and form concepts about things related to the objects, and it is expected to facilitate learners in understanding the content of fable story materials.

In Indonesian language learning in elementary schools, there are many materials about stories, one of which is the fable. A fable itself is a form of traditional story featuring animal characters. These animals can think and interact like humans, and they can also live like humans. The animals can think, possess logic, have feelings, speak, and behave, among other traits [13].

Based on the results of observations and interviews conducted by the researcher with the second-grade teacher at TK Dharma Pertiwi, it was found that there had been no development of learning media used for fable story materials. The learning process for fable story materials has not been optimized because the instruction does not utilize creative and innovative learning media. Learning was carried out using only printed media without the availability of supporting learning media, causing learners to lack a thorough understanding of fable story materials. The learning process was also less varied, resulting in a lack of student interest in learning. In teaching fable stories, learning media is highly crucial to use and develop so that learners can increase their interest and motivation in learning during lessons on fable story materials.

To ensure a focused and deep analysis, the boundaries of this study are defined as follows: Content Scope: The instructional material specifically focuses on plant and animal life, utilizing distinct characters including a Monkey, Buffalo, Rabbit, Tiger, and Elephant, along with relevant natural items like bananas, grass, carrots, and leaves. Target Audience: The media is explicitly customized for early childhood students aged 4 to 6 years old at TK Dharma Pertiwi. Technical Specifications: The final output is a completed 20-minute video asset rendered in Full HD resolution (1920x1080 pixels) running at 30 fps, packaged using Adobe Premiere Pro 2020.

2. RELATED WORK

To position this study within the existing academic discourse, this section reviews relevant literature surrounding early childhood learning media, educational video development, traditional puppetry in education, and the pedagogical impact of nature and animal introduction.

2.1 Learning Media in Early Childhood Education

Learning media plays a foundational role in Early Childhood Education (ECE) by transforming abstract concepts into concrete experiences. According to Guslinda and Kurnia (2018), proper learning media designed specifically for early childhood education is crucial for stimulating children's sensory organs and driving active participation in the classroom[14]. Without dedicated instructional tools, young children often struggle to maintain focus, making interactive and visually appealing media a necessity rather than an option in modern preschools. This study builds on this theory by developing a targeted media solution to address the lack of interactive instructional tools at TK Dharma Pertiwi.

2.2 Educational Video and Multimedia Development

The integration of digital video into the curriculum has proven to be an effective framework for modern knowledge transfer. Research by Alamsyah, Toenlloe, et al. (2018) highlighted that the structured development of broadcasting and instructional learning videos successfully optimizes engagement and clarifies complex materials for students [15]. Their work underscores the importance of systematic video production—ensuring technical quality such as clear narrative sequencing and audio-visual balance—which directly influences how effectively a target audience absorbs information. Aligning with their framework, this study applies high-definition rendering and meticulous audio editing to ensure pedagogical clarity for young viewers.

2.3 Traditional Puppetry (Wayang) as a Pedagogical Tool

The utilization of puppetry as an educational medium leverages deeply rooted cultural storytelling traditions to capture children's interest. Anggoro (2018) conducted a historical study demonstrating that wayang (puppetry) has long evolved from mere performing arts into a highly effective instrument for community education, social broadcasting, and value dissemination (da'wah) [16]. Puppetry inherently possesses a unique imaginative appeal; animal characters operating within a puppet world encourage children to think more broadly, expand their creative thinking, and view narrative conflicts from fresh perspectives. This research adapts these traditional storytelling mechanics, translating physical paper-based puppetry into a modernized digital video format.

2.4 Animal Introduction and Early Childhood Cognitive Development

Introducing the natural ecosystem, flora, and fauna to young children plays a significant role in shaping their environmental awareness and intelligence. A study by Suhartini and Laela (2018) emphasized that introducing animals to early childhood students significantly improves their naturalistic intelligence and cognitive retention. When children learn to recognize external anatomical traits, habitats, and dietary behaviors, it sharpens their observational and listening comprehension skills. Their findings support the content strategy of this project, which explicitly embeds animal and plant identification within an interactive fable narrative.

2.5 Synthesis and Research Gap

While previous studies have thoroughly explored the separate domains of early childhood learning media (Guslinda & Kurnia, 2018), technical video development (Alamsyah et al., 2018), the educational value of puppetry (Anggoro, 2018), and nature introduction (Suhartini & Laela, 2018), there is limited literature addressing the direct synthesis of these elements into a single digital platform for localized kindergarten curriculums [14], [15], [16], [17]. This study addresses this gap by combining traditional, physical paper puppetry crafting with modern high-definition digital post-production to deliver a structured 20-minute plant and animal life curriculum specifically optimized for the students of TK Dharma Pertiwi.

3. METHODOLOGY

This study utilizes a combination of qualitative data collection methods and a structured multimedia development framework to design, implement, and evaluate the digital puppetry-based learning media. The methodology ensures that the final educational product aligns with both pedagogical standards and technical video production quality.

3.1 Research Location and Subjects

This study was conducted directly at TK Dharma Pertiwi, an early childhood education institution located in Kedonganan, Kuta, Badung, Bali. The primary subjects involved in this

research include the school's headmaster and teachers, professional videography experts, and a target audience consisting of kindergarten children aged 4 to 6 years along with their parents.

3.2 Data Collection Methods

To gather comprehensive data for the material content and technical specifications, four triangulation methods were employed. Direct field observations were initially conducted at TK Dharma Pertiwi to analyze the existing curriculum, available teaching materials, and the real-time methods teachers use to instruct children about nature, plants, and animals. This was followed by semi-structured interviews with two key informants: Ni Nyoman Sukarmini, S.Pd., M.I.Kom., the Headmaster of TK Dharma Pertiwi, who discussed the core subject matter, student needs, and the overall teaching-learning process; and I Wayan Arya Adnyana, a professional videographer, who provided technical insights into high-quality video production tailored for young audiences. Furthermore, data was collected through questionnaires in two separate phases: a pre-production phase involving 56 parents to assess the initial demand for interactive digital learning tools, and a post-production phase involving 40 parents and children to evaluate product feasibility, engagement levels, and cognitive impact. Finally, a thorough literature review was conducted—examining academic journals, books, and institutional archives such as the school's Weekly Learning Implementation Plans (RPPM)—to establish a strong theoretical and material foundation for the study.

3.3 Media Production Framework

The development of the learning video follows a three-tiered production pipeline: Pre-Production, Production, and Post-Production.

Pre-Production

The pre-production phase encompasses several key steps, beginning with concept formulating to design the educational concept based on the standard kindergarten curriculum for plant and animal life. This is followed by scriptwriting, which involves drafting the dialogue and structural breakdown for a 20-minute runtime, effectively dividing the video into an educational introduction and an interactive fable titled "The Tiger Who Deceived the Buffalo." Finally, storyboarding is conducted to create a visual blueprint that maps out camera angles, asset placements, and character movements prior to the actual filming.

Production

During the production phase, physical puppet characters were constructed from scratch out of durable solex paper by sketching animal profiles—including the Monkey, Buffalo, Rabbit, Tiger, and Elephant—cutting out their contours, applying primary coats of grey primer, and finalizing details with vivid watercolors. For rigging and staging, movable limbs were connected using clear nylon strings to allow smooth puppet manipulation, after which the characters were mounted on bamboo handles and performed live on a traditional banana tree log stage. These scenes were recorded using a Lumix G7 mirrorless camera, consistently maintaining an eye-level camera angle to optimize visual focus and simulate a direct, engaging perspective for the children. Moving into the post-production phase, the raw footage was imported, sequenced, and polished inside Adobe Premiere Pro 2020. To support fundamental literacy development, subtitles and core vocabulary keywords were integrated using a clear Times New Roman Serif font, while the audio engineering process combined voiceover tracks for character dubbing with a cheerful background music score and realistic forest ambient sound effects. Ultimately, the final synchronized project was rendered and exported into an optimized MP4 file format with a Full HD resolution of 1920x1080 pixels running at 30 fps.

4. RESULTS AND DISCUSSION

The steps involved in the realization process of the puppet-based learning media about animals and plants for early childhood are divided into two (2) stages:

4.1 *Pre-Production*

The pre-production stage constitutes the planning phase, which involves defining the concept/idea of the learning media to be developed and conducting research or exploring data related to the concept/idea to be realized. In this learning media, there are three stages:

Concept: The concept used in creating this learning media is to present the instructional material through an animal puppet performance set in nature, which will then be displayed in the classrooms or study areas of TK Dharma Pertiwi students in the form of a digital video. Knowledge about plants and animals is acquired from the stories enacted in the video. In this manner, early childhood children will become engaged and interested in watching the produced video.

Visual Strategy: The creation of this learning media is inseparable from the supporting visual elements involved in its development. The implementation of these visual elements within the visual strategy used is as follows:

The illustrations used in the creation of this learning media focus on material related to animals and plants. Through these illustrations, the learning process regarding the introduction of animal names can be effectively implemented.

4.2 *Production*

In the production process of the early childhood learning media video featuring animal puppetry, several stages were carried out, including character creation, shooting, editing, and adding background sound. The entire production phase utilized Adobe Premiere Pro 2020 for video editing. Additionally, other equipment and materials prepared for this process included a camera, clip-on microphone, tripod, black cloth, table, banana tree trunk, lights, script, puppets, and a puppeteer (dalang). The specific steps conducted during the production stage are detailed below:

Creating the Puppet Characters

The stages of creating the puppet characters are as follows. The puppets were made using solex paper, which was sketched beforehand. After being drawn, the solex paper was cut according to the required size for the respective puppet characters. Following this process, the cut paper was further carved using specialized puppet-making chisels to follow the outline of the sketch. Once the carving process was complete, the puppets were coated with gray paint as a base color. After the primer dried, the puppets were painted according to their character colors. Once the coloring process was finished and dry, bamboo sticks were attached to the puppets to serve as handles and supports to stick them into the banana tree trunk during the learning video production. The footage captured during the sketching and cutting of the animal puppet characters made from solex paper can be seen in Figures 1.



Figure 1. Creating Puppet Characters

This process marks the initial step after all tools and materials for making the puppet characters have been prepared. In this phase, the solex paper was sketched using a pencil to form the desired animal characters. Once the sketching was complete, the paper was cut accordingly using scissors. Then, it was precisely cut or carved using specialized puppet-making chisels.

Character Coloring Process

After completing the cutting and carving process, the procedure continued with the base coloring and final coloring stages—representing the concluding phase of the coloring process—using watercolors. Following this, bamboo sticks were attached to the puppet characters to serve as handles and supports for sticking them into the banana tree trunk used during the performance.

Joint Assembly on Monkey and Elephant Characters

After completing the coloring process, the procedure continued with the installation of bones or joints on the arms of the monkey character and the trunk of the elephant character. The installation of these bones or joints utilized clear nylon strings with a size of 70–80. This process was conducted by perforating the parts that serve as the curves or movement joints of the characters' bodies. After being perforated, a small amount of the string was inserted and then cut according to the required size. Finally, the string was heated with a lighter until it melted, and then pressed flat until it dried and solidified. The resulting images can be seen in Figure 2 below.



Figure 2. Joint Assembly on Monkey Character

Final Results of the Characters

After completing the coloring process and assembling the joints on the characters, the following are the results of each character that has undergone the entire fabrication process. The resulting images can be seen in Figure 3 below.





Figure 3. Final Results of the Characters

4.3 Post-Production

Post-production is conducted after the production process is complete. In this phase, the activities include transferring video files from the camera's memory card to a PC, video editing, adding text or captions to the video, applying transition effects, and executing the final rendering process. The specific stages in the post-production process are as follows:

Video Preparation

The first step in post-production is preparing the video files to be edited. In this stage, the footage captured during the recording or shooting process is transferred from the camera's SD memory card and copied to the PC that will be used for editing.

Video Editing Process

The subsequent step is the video editing process, which is carried out as follows: The first phase involves creating a new project in Adobe Premiere Pro 2020 to configure settings such as the sequence width, ensuring that the workspace aligns with the intended specifications. Once configured, the actual editing process can begin. The next step taken by the author is to import the video files from their storage location into the Adobe Premiere Pro 2020 application. This process aims to select the specific and appropriate videos or files that will subsequently undergo the editing process.

The next part is the video editing phase, where the author edits the files that have been imported from the storage location into Adobe Premiere Pro 2020. Additionally, subtitles are included as a tool to help the audience understand the story's content or hear the dialogues spoken by the puppeteer (dalang). Transition effects are also added to enhance and increase the visual appeal of the video when starting and ending the story, as well as during scene cuts.

Artwork Visualization

The visualization of this learning media can be seen in the image below:

Scene 1 Displays one monkey puppet acting as the host, delivering the opening introduction and briefly explaining the concepts of nature that will be discussed as the learning material. The shot is captured using the eye-level camera technique, as shown in the Figure 4 below.



Figure 4. Eye level scene 1

Scene 2 Displays the first animal to be introduced by the monkey puppet, which is a buffalo. The shot is captured using the eye-level camera technique, as shown in the image below.



Figure 5. Eye level scene 2

Scene 3 Displays the buffalo sharing what food he likes and dislikes, both from nature and given by humans, with the monkey assisting in the explanation. The shot is captured using the eye-level camera technique, as shown in the Figure 6 below.



Figure 6. Eye level scene 3

Scene 4 Displays a tiger that is feared by the buffalo, causing the buffalo to run away to escape from the tiger. The shot is captured using the eye-level camera technique, as shown in the Figure 7 below.



Figure 7. Eye level scene 6

Scene 5 Displays the tiger proudly demanding that the monkey tell a brief story about his bravery to the children. The shot is captured using the eye-level camera technique, as shown in the Figure 8 below.



Figure 8. Eye level scene 4

Scene 6 Displays the tiger after his story has been told to the children, who then leaves to hunt the buffalo, as he is a carnivorous animal that loves to hunt. The scene then continues with other animals introduced by the monkey, moving into their life stories in the wild, up until the closing section. In the closing part, all characters are asked to gather and thank the children for participating in the lesson from beginning to end. The shot is captured using the eye-level camera technique, as shown in the Figure 9 below.



Figure 9. Eye level scene 5

Testing Analysis Results

Upon the completion of the early childhood learning media in the form of animal puppetry, the process continued with evaluation testing involving 40 respondents consisting of the students' parents. The testing was conducted by distributing a series of questions via a research questionnaire utilizing Google Forms. The data obtained from this process are presented in Table 4.1 below:

Table 4.1

No	Questions	Yes	No
1	Does the animal puppetry learning media feel enjoyable for children?	50	
2	Is the educational content of the animal puppetry learning media effectively conveyed to children?	49	1
3	Does this learning media enable children to identify or acquire one or even multiple aspects of knowledge regarding animals?	50	
4	Is the learning media capable of maintaining children's interest if shown again to learn about nature through this animal puppetry platform?	50	

5	Does the learning media support children's growth and development in terms of their knowledge about animals?	49	1
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5. CONCLUSION

The research and development of the digital puppetry-based educational video, titled "Design of Early Childhood Learning Media on Plant and Animal Life," has been successfully completed and implemented for TK Dharma Pertiwi. This study successfully bridges the gap identified in conventional, verbal-only teaching methods by integrating traditional cultural storytelling (wayang) with modern digital multimedia technology, specifically using a Lumix G7 mirrorless camera and Adobe Premiere Pro 2020. The final 20-minute educational asset offers a structured and comprehensive pedagogical tool that aligns with the institution's Weekly Learning Implementation Plans (RPPM).

Based on the multi-tiered evaluation framework, the effectiveness of this learning media is empirically validated through three core evaluation channels:

1. **Target Audience Testing:** Feedback collected from 40 parents and children demonstrated that 100% of respondents found the puppetry media format highly entertaining and engaging. Furthermore, over 97% of respondents reported a significant improvement in children's ability to identify external plant and animal characteristics and retain educational concepts.
2. **Media Expert Validation:** Evaluated by I Ketut Setiawan, S.Pd., M.Sn., the video production achieved a 100% satisfactory approval rating across all technical parameters, including voiceover clarity, ambient sound synchronization, subtitle legibility (using Times New Roman font), optimal display brightness, and layout feasibility for wide distribution.
3. **Material Expert Validation:** Evaluated by Ni Nyoman Sukarmini, S.Pd., M.I.Kom., the content was verified as highly appropriate for early childhood cognitive levels (ages 4 to 6), featuring light and comprehensible vocabulary woven into interactive fables like "The Tiger Who Deceived the Buffalo" to teach moral values alongside natural sciences.

In conclusion, this digital puppetry learning media provides a practical, low-cost, and highly effective alternative for kindergarten teachers to stimulate imagination, sharpen listening comprehension, and enhance ecological awareness among early childhood students.

6. FUTURE DIRECTIONS AND SUGGESTIONS

While the current implementation has yielded highly positive outcomes, several areas can be expanded in future research to maximize pedagogical impact:

1. **Technological Integration:** Future iterations could transition from physical puppet filming to advanced 2D or 3D digital animation software to achieve smoother character movements, richer visual effects, and standardized digital assets.
2. **Interactive Features:** Developing this content into interactive mobile applications (Android/iOS) rather than linear video formats would allow children to actively interact with the characters, thereby boosting experiential learning.
3. **Curriculum Expansion:** The character roster and narrative scope should be expanded beyond the existing animals (Monkey, Buffalo, Rabbit, Tiger, Elephant) to cover broader environmental topics, such as marine life, domestic animals, and various plant ecosystems.

Broader Distribution: Future initiatives should look into evaluating the implementation of this media across a wider demographic of kindergarten institutions throughout the region to establish a more generalized standard for digital cultural-based learning media.

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