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The Use of Animation Media for Science Learning in Group B Children at RA Cahaya Insani

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ABSTRACT

Objective: *This study aims to describe the application of animation media in science learning and evaluate its effects on the understanding and interest of group B children at RA Cahaya Insani. The focus is on how animation media facilitates comprehension and fosters enthusiasm for learning abstract concepts.* ***Methods:*** *A qualitative descriptive approach was employed, utilizing observations, interviews, and documentation as data collection techniques. This method allowed for an in-depth exploration of the interactions between children, teachers, and the animation media.* ***Results:*** *The findings indicate that animation media significantly improves children's grasp of abstract concepts, such as the water cycle, by providing engaging and clear visualizations. Children exhibited increased enthusiasm and active participation in class activities. Teachers found that animation media eased the delivery of complex materials while encouraging critical thinking among students. Despite technical challenges like limited device availability, these were effectively addressed through meticulous planning and creative strategies by teachers.* ***Novelty:*** *This study highlights the innovative use of animation media in early childhood education, emphasizing its potential to enhance both cognitive and social development. It underscores the role of technology in creating effective and enjoyable science learning experiences, suggesting its broader application for diverse science topics in the future.*

INTRODUCTION

Science is a discipline that focuses on understanding natural phenomena, so it not only encompasses the mastery of facts, concepts, or principles but also involves the process of discovery [1]. Literally, science can be defined as the study of various natural phenomena. Conceptually, science is a scheme interconnected through a series of experiments and observations that can be further tested. Science encompasses the process of acquiring knowledge and the workings of that process [2]. In the context of early childhood, science is designed to be introduced according to their perspective, with the aim of helping children understand scientific concepts. Currently, introducing science to young children is important because it can encourage them to think critically and train them not to accept or reject something outright without consideration.

Introducing science from an early age can encourage children to become inspiring, creative individuals with high initiative and the ability to develop logical thinking [3]. Science also provides children with the opportunity to understand themselves, their surroundings, and apply it in their daily lives [4]. Early science education trains children to use their intellect, strength, and honesty. In general, there are two main processes in early childhood science education, namely the scientific process and the scientific skills

process. The scientific process of learning science, or the scientific approach, involves a cycle of forming hypotheses, collecting data, verifying or rejecting hypotheses, making generalizations, and repeating the cycle [5].

Basic skills in the scientific process include observing, classifying, comparing, measuring, communicating, experimenting, connecting, concluding, and applying. However, since concluding and applying require abstract thinking abilities, these two skills are not expected to be mastered by early childhood children and will be developed in the next educational stages. Scientific process skills in early childhood do not develop automatically, but need to be trained to develop well. The term "skill" refers to the ability to do something quickly and correctly, so someone who is quick but wrong, or correct but slow, is not yet considered skilled. Although scientific process skills are not exclusive to science and relate to other approaches, they all remain oriented towards active learning designed with clear objectives. In early childhood, skills such as observing, classifying, comparing, measuring, communicating, and experimenting become the main focus, as these skills help children process new information through experimentation, support daily activities, and prepare them for further studies in acquiring knowledge [6].

The values of science for early childhood focus on the development of cognitive, motor, and social aspects through exploratory experiences that support their initial understanding of the surrounding world. The mastery of knowledge by children can be achieved through meaningful processes or activities [3]. To help children understand scientific concepts, whether they are facts, concepts, or theories, they need to be facilitated with activities that encompass both content and process dimensions, such as observation, reading, discussion, experimentation, or the use of relevant media. In the affective dimension, children also need to be given deep emotional experiences through certain atmospheres or situations so that these affective values can be instilled and form a character that becomes part of the child's identity. Moreover, science education not only contributes positively to cognitive and affective development but also supports psychomotor development. The scientific values related to psychomotor skills help children develop the ability to move their body parts, both through gross and fine motor skills, so they can effectively manipulate their environment by coordinating their thoughts and physical abilities.

Learning media plays an important role in enhancing the learning process of students, which is ultimately expected to improve the learning outcomes achieved [7]. Research shows that there are significant differences in the learning processes and outcomes of students between learning without media and learning with media. Therefore, the use of learning media is highly recommended to improve the quality of education. In early childhood education, the role of media is becoming increasingly important because children are at the stage of concrete thinking. One of the principles of early childhood education is to base learning on reality, so that children can learn something in a tangible way. This emphasizes the need for media as a means of conveying educational messages that enable children to learn concretely. The types of

media that can be used in learning are very diverse, leading to efforts to group and classify them based on their similarities in features or characteristics.

Learning media can be divided into three main categories: visual media, audio media, and audio-visual media [8]. Visual media is media that can only be seen, and this type is often used by teachers in early childhood education institutions to help convey learning materials. This visual media is divided into two types, namely projected visual media and non-projected visual media (non-projected visual). Audio media, on the other hand, is a medium that conveys messages in the form of sound (auditory) aimed at stimulating children's thoughts, feelings, attention, and motivation in understanding the material. In early childhood education, audio media is generally used to train listening skills. However, due to its nature of relying solely on sound, this medium has limitations that are often overcome by combining it with other media. Audio-visual media, as the name suggests, combine audio and visual elements, allowing for a more complete and effective presentation of material. This media also has the advantage of delivering learning themes optimally and, to some extent, can replace the role of teachers in delivering material. Thus, teachers can shift their role to become facilitators who help children learn independently through the learning media.

In early childhood education, learning media is needed as an effective intermediary to keep children's attention from getting bored quickly and to enable them to concentrate longer compared to without media. The success of the learning process highly depends on the support of appropriate learning media, as media can enhance the effectiveness of message delivery and lesson content [9]. One of the popular modern learning media is audio-visual media. The use of such media makes it easier for teachers to deliver learning materials to children.

At RA Cahaya Insani, one of the main challenges faced by teachers in science education is the low engagement of children. Group B, aged 5–6 years, often shows less interest when learning is conducted conventionally, such as using printed books or verbal explanations. At this age, children tend to be more interested in interactive and visual activities. Traditional methods are often ineffective in conveying abstract scientific concepts, such as the change of states of matter or natural phenomena. Children quickly become bored, have difficulty concentrating, and struggle to understand the material being explained.

To address this issue, teachers at RA Cahaya Insani began implementing animation media as an innovation in science education. Short animated videos depicting scientific phenomena, such as the water cycle, motion of objects, and animal life, are used to capture children's attention. This animated media is liked because of its colorful appearance, movement, and engaging sound. In several trials, the children appeared more focused and enthusiastic. For example, when studying the water cycle, they find it easier to understand the processes of evaporation, cloud formation, and rain. Previously, this concept was difficult to explain with just static images or verbal explanations, but

through animation, children can see the process visually and understand the cause-and-effect relationships.

The use of animation media at RA Cahaya Insani shows an increase in children's understanding of science concepts and their interest in learning. This confirms that the integration of technology, such as animation, in early childhood science education not only enhances the effectiveness of learning but also significantly supports their cognitive development.

The purpose of this research is to describe and analyze the use of animation media in science learning. The problem formulation in this research includes several important aspects. First, this research will describe in detail the application of animation media in the learning process, from planning to implementation. In this case, it will be explained how teachers select and prepare appropriate learning materials for animation media, as well as the methods used to integrate this media into learning activities. Secondly, this research aims to analyze the impact of using animation media on children's understanding and interest in science learning. The research will explore whether animation media can enhance children's motivation to learn, how this media facilitates the understanding of scientific concepts that may be difficult for children to grasp, and how children react to the animation media during the learning process. This research will also identify the constraints faced by teachers in the implementation of animation media, both technical, such as limited access to devices and software, and the time required to prepare and execute the use of animation media. In addition, this research will examine non-technical constraints that may arise, such as the readiness and skills of teachers in using animation media and the responses and engagement of children when the media is applied in the classroom. By conducting an in-depth analysis of these aspects, this research is expected to provide valuable insights for educators in developing and implementing more effective teaching methods using animation media, thereby improving the quality of science education in early childhood education settings.

RESEARCH METHOD

The method in this research is qualitative using a descriptive qualitative approach, where the data collected consists of words and direct observations of the data in the field (field research). According to Bogdan and Tylor in Moleong, 2011: 4, qualitative research means a research procedure that produces descriptive data in the form of written or spoken words from people and observed behaviors. This research was conducted at RA Cahaya Insani to gain a deep understanding of the use of animation media in science learning for Group B children at RA Cahaya Insani. The main focus of this research is how animation media affects children's understanding and interest in learning science subjects.

Data collection was carried out using several techniques. First, direct observation during the learning activities. This observation was conducted with the aim of directly seeing how children interact with the animation media used by the teacher in science

learning. This observation also records the children's responses, their engagement in the learning process, and how the animation media helps them understand the science concepts being taught.

Second, interviews were conducted with teachers and several children as research subjects. Interviews with teachers aim to explore their views on the effectiveness of animation media in facilitating learning. Teachers were also asked about the challenges faced in the implementation of animation media and how they overcame those challenges. Additionally, interviews with children were conducted to understand how they felt about the use of animation media in learning, whether they found it more engaging or easier to understand science lessons through that media.

Third, documentation in the form of activity photos, daily notes, and children's learning outcomes is collected to strengthen the results of observations and interviews. This documentation helps provide visual evidence that supports the analysis, making it easier to see the relationship between the use of animation media and children's learning outcomes. The data validity technique is carried out with triangulation of techniques to verify data from various sources. Triangulation of techniques is applied through interviews, observations, and documentation. Data analysis is conducted continuously from the moment data is obtained in the field, including data collection, data presentation, data reduction, and finally, drawing conclusions. The data analysis techniques used by the researchers can be seen in Figure 1.

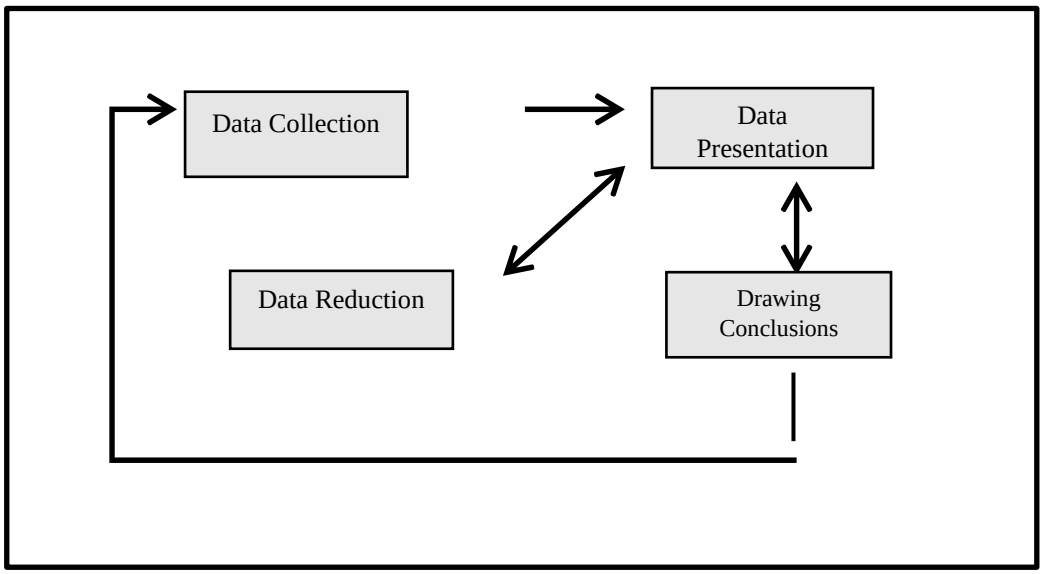

Figure 1. Miles and Huberman data analysis technique.

RESULTS AND DISCUSSION

The planning stage begins with the teacher preparing animation media to be used in science learning, in accordance with clear learning objectives. The teacher ensures that the animation is age-appropriate for the B group children at RA Cahaya Insani and aligns with the topics being taught, such as the water cycle. The chosen media is designed with

engaging visual elements, such as cloud transitions, rain, rivers, and the sun, to help children understand abstract concepts in a fun way. In an interview, the teacher mentioned that animation helps children understand material that is difficult to explain with words, especially if the visual elements are dynamic and brightly colored. The results of the observation show that animation media are effective in increasing children's engagement during learning. This is in line with the findings [10], which states that the use of media can enhance students' understanding and retention of learning, as well as create an enjoyable learning atmosphere. In addition, simple animated learning media can help children understand the theme being taught through interesting and colorful images. For example, animations showing rain falling and flowing into rivers help children visualize the water cycle process that might be difficult to explain with words alone. Based on field observations, animation also motivates children's active involvement during the learning process.

Moreover, the use of animation media in science education has further benefits, namely improving children's memory and learning motivation. Engaging animated media can make children more enthusiastic about following lessons, in line with the indicator "animated media is chosen according to the age and needs of the child" in the observation instrument. Fun and educational animations can create an interactive learning atmosphere. This is supported by research [11], which emphasizes that animation plays an important role in increasing children's motivation and interest in early literacy. For example, when the teacher presents an animation about the water cycle followed by questions or discussions, the children not only find it easier to remember the process but also feel confident when answering questions or explaining their understanding.

The observation instrument also includes indicators that children must be active and engaged during the use of animated media. In this case, animations that allow interactivity, such as selecting certain elements or answering questions within the animation, are very helpful in increasing their engagement. Children are not only recipients of information but also active participants in the learning process, as observed in the documentation of learning activities. A thorough planning stage, including selecting animation media that aligns with the learning objectives and the characteristics of Group A children, significantly contributes to the success of the learning process. The combination of engaging visual elements and interactive features creates an effective and enjoyable learning experience, allowing children to better understand scientific concepts, as stated in the interview and evaluation results.

The use of animated videos makes it easier for teachers to teach and helps children understand the material, increases motivation, and makes them more active in asking questions [12]. In planning the use of animation media for science learning, the teacher at RA Cahaya Insani follows systematic steps according to the observation instrument. The first step is to choose a relevant topic, such as the water cycle, and identify key concepts such as evaporation, cloud formation, rain, and water flow. The second step is

to design visually appealing elements that are appropriate for early childhood characteristics, such as rain animations with visuals of dark clouds releasing water droplets. The third step is to ensure the animation has a clear and logical narrative flow, explaining the water cycle gradually, which helps children understand cause-and-effect relationships in the scientific process. This approach is reflected in the learning activity documents that show the active involvement of the children.

The stages of implementing animation media in science learning include three main activities: the opening activity, the core activity, and the closing activity, in accordance with the indicators in the observation instrument on the implementation of animation media in science learning. Based on the observation results, the learning process is conducted in the classroom at the scheduled time, from 08:00 AM to 09:30 AM, creating a pleasant and focused learning atmosphere. This activity is designed so that children can actively engage, supporting the achievement of learning objectives.

The opening activity begins with the teacher greeting the children, giving a salutation, and leading a prayer together to create a solemn atmosphere. The teacher then provides an aperception through a relevant question or short story, such as, "Have you ever seen a rainbow after the rain?" Why do rainbows appear? The teacher also showed a simple picture to pique the children's curiosity. The purpose of this activity is to build a connection between the lesson material and the child's daily experiences, in accordance with the indicator that animated media should be used effectively to capture the child's attention.

The core activity is the stage where animation media is used as the main teaching aid in learning. The teacher plays the prepared animation and ensures all the children can see the screen clearly. Before the animation begins, the teacher explains the learning objectives, such as, "We will see how water turns into clouds and comes back to the earth." During the animation playback, the teacher actively guides the children by providing additional explanations on important parts, for example, "Look at this! Water in the sea evaporates because of the sun's heat." The teacher also uses pauses to ask the children, such as, "What do you think will happen next?" This creates an interactive learning atmosphere, in line with the indicator that children should be active and engaged during the learning process. After the animation is finished, the teacher continues with a discussion and Q&A session to clarify difficult concepts, provide concrete examples, and encourage the children to share their opinions. The teacher praised the child's participation, saying, "Very good answer!" Any other ideas?Context: ” \nText to translate: ”

The closing activity aims to summarize the learning and reinforce the child's understanding. The teacher summarizes the important points of the lesson in simple language and assigns tasks related to the material, such as drawing the water cycle or role-playing as elements of the water cycle. This activity is designed to reinforce understanding in a fun and interactive way, as recorded in the evaluation aspect of the instrument. Before concluding, the teacher invites the children to share their experiences

during the lesson, for example, what they liked most about the animation. The teacher then led the closing prayer and gave a farewell greeting to mark the end of the lesson.

The application of animation media in science education aims to enhance the interest and understanding of early childhood children towards abstract and difficult-to-explain science concepts. This process includes several stages, from preparation to evaluation, to ensure that the animation media used is effective and meets the developmental needs of children, in accordance with the indicators in the observation instrument. Teachers also need to ensure the involvement of all children, including those with special needs or different levels of understanding, by varying activities after the animation screening, such as drawing the water cycle, role-playing, or group discussions. This allows each child to contribute according to their interests and abilities, which ultimately boosts their confidence in learning. The role of the teacher is very important in this process, not only as an information provider but also as a facilitator who encourages interaction and discussion, and is sensitive to children's responses during the animation screening, such as interest or confusion. Teachers can use techniques such as asking simple questions or giving small challenges to maintain children's focus and ensure their engagement in learning.

The first step in implementation is to provide a simple and engaging introduction to the material that will be taught. Before the animation is played, the teacher gives a short story in language that is easy for children to understand, using cheerful facial expressions and enthusiastic voice intonation. For example, for the topic of the water cycle, the teacher tells the story of water's journey from the clouds to the river and back to the sky. This introduction aims to spark children's curiosity and prepare them emotionally and mentally to receive new information, in accordance with the aspects of children's socio-emotional development [13].

The next stage is the screening of animated media. The animations used have engaging visual elements, such as bright colors, cute characters, and child-friendly narration. This media is designed according to the cognitive development of early childhood children, who find it easier to understand concepts through visuals and interactive stories [14]. During the animation, the teacher actively provides guidance, explains important concepts, and pauses the animation at certain points to discuss the displayed content. For example, when the animation shows the process of evaporation, the teacher can ask, "What happens to the water when it is exposed to sunlight?" These questions are designed to encourage children to think critically and connect the information in the animation with their daily experiences, in accordance with the learning objectives outlined in the instrument.

The application of animation media in science learning uses an interactive method that involves discussion and sharing opinions. The teacher provides children with the opportunity to ask questions or give comments about the animation they watched, in accordance with the indicators in the observation instrument regarding children's engagement. This discussion not only strengthens children's understanding but also

trains their skills in speaking in front of friends and listening to others' opinions. The teacher acts as a facilitator, ensuring that every child has the opportunity to speak and feel valued. After the discussion, the teacher continues with follow-up activities to reinforce understanding, such as simple experiments, role-playing, or creative tasks like drawing the water cycle. For example, the children are invited to draw the water cycle in their own way, using bright colors, or to role-play as the sun, clouds, and rain. This activity is designed so that children can express their understanding creatively and enjoyably, in accordance with the indicators in the evaluation aspect.

The application of animation media also includes effective classroom management to maintain children's focus and engagement during learning. The teacher needs to create a lively classroom atmosphere through praise, motivation, and light humor to maintain the children's attention. If there is a child who loses interest, the teacher can use strategies such as asking specific questions or involving them in class activities, according to the interview conducted, where the teacher must promptly address this challenge so that all children are engaged. Animation media was chosen for its ability to simplify complex scientific concepts, such as the water cycle or photosynthesis, which are difficult to understand with just verbal explanations or still images. Visual elements, such as water evaporating, turning into clouds, and falling back as rain, help children understand this process in a tangible way even though it cannot be seen directly. In addition, animation allows children to experience things that are difficult to do in class, such as watching a volcano erupt or stars forming in outer space. In accordance with the indicators in the observation instrument, the animation is designed to present visual elements and narratives that align with the child's cognitive development, ensuring that the material is delivered in a way that is easy to understand and engaging for them.

Animation media also has a positive impact on the learning motivation of early childhood children, according to the findings [15] that animated videos can spark children's interest through a combination of sound and images. Children tend to learn through enjoyable activities, and animations provide a lively and interactive learning atmosphere. The teacher can rewind certain parts of the animation to repeat information, providing additional explanations without losing the children's interest. This is the advantage of animation media compared to traditional teaching methods, which find it difficult to provide repetition in an engaging way.

With animation media, abstract concepts can be visualized dynamically, allowing children to understand cause-and-effect relationships in natural events such as the water cycle. The combination of audio-visual elements—such as clear narration, background music, bright colors, and movement—helps reinforce children's memory, as suggested in research [15]. For example, when children see an animation of a blooming flower while hearing a description of photosynthesis, the information is easier to remember compared to just hearing an explanation without visuals. This aligns with the goal of using animation media, which is to provide an effective, enjoyable, and meaningful learning experience for early childhood children.

The use of animation media encourages children's curiosity and learning motivation, in accordance with the indicators in the instrument that measures children's engagement and interest in learning. This media makes science learning more enjoyable, resembling a game that naturally captures children's attention. The teacher can take advantage of this moment to foster curiosity by asking reflective questions during or after the animation is played. For example, after watching an animation about the forest ecosystem, the teacher can ask, "What would happen if all the trees in the forest disappeared?" Questions like these not only spark active discussions but also develop children's critical thinking skills and deepen their understanding of the material being taught.

In addition to cognitive benefits, the use of animation media in learning also supports the emotional and social development of children. When children watch animations that depict the interaction of living beings with nature, they can develop empathy and a sense of care for the environment, as noted in the observation instruments regarding social-emotional development. For example, animations that show the impact of pollution on sea animals can move children to feel motivated to keep the environment clean. This opens up opportunities for teachers to integrate moral and ethical education into science teaching.

Animation media supports collaborative-based learning by encouraging children to work together in activities such as group discussions or creative projects after watching the animation. For example, after watching an animation about insects, children can be invited to make insect models from recycled materials in groups, which enriches their learning experience and teaches the importance of exploration, sharing, and cooperation. The role of the teacher is very important to maximize the use of animation media, where the teacher must maintain the children's focus during the animation screening and provide relevant context before and after the animation. Before playing the animation, the teacher can provide a brief background and invite the children to make predictions, while after the animation is finished, the teacher facilitates a discussion to deepen the material and connect it with the real world. The teacher also acts as a facilitator to ensure that the animation media supports the expected learning objectives. However, challenges still exist, such as limited facilities or technical obstacles in playing animations, which require teachers to have a backup plan, such as using props or telling stories interactively if the animation cannot be played. Furthermore, teachers must be sensitive to the needs of each child, as not all children respond to animations in the same way. Some children may require additional guidance or more detailed explanations to understand the material presented through animations, in accordance with the indicators in the observation instrument regarding different learning needs.

The use of animation media at RA Cahaya Insani has had a positive impact on science learning. Children appear more focused and enthusiastic when the material is presented through animation. In learning about the water cycle, for example, children show a better understanding by visualizing the processes of evaporation, cloud

formation, and precipitation. Animation media helps children remember the learning process better, as recorded in evaluations and observations. In addition, the children appeared to be more creative in follow-up activities such as drawing the water cycle or creating short stories. In terms of efficiency, animation media allows teachers to convey complex material in a short time without compromising the quality of learning, in accordance with the indicators on the evaluation instrument that show an increase in learning efficiency. However, technical challenges such as device limitations or children's tendency to become overly focused on animation visualization may require additional guidance from teachers. Overall, the use of animation media has proven effective in enhancing material understanding, children's engagement, and their creativity in science learning at RA Cahaya Insani.

At RA Cahaya Insani, science learning is conducted with a creative and interactive approach to suit the characteristics of early childhood. The teachers at this school understand that young children have a high sense of curiosity and learn well through direct and visual experiences. Therefore, the school implements various methods to introduce science concepts in a fun and easily understandable way. One of the approaches used at RA Cahaya Insani is the utilization of visual media, especially animation. For example, when studying the water cycle, the teacher shows an animated video that depicts the process of water evaporation from the sea due to the sun's heat, the formation of clouds in the sky, and the occurrence of rain that returns to the ground. Through this animation, children not only hear verbal explanations but also see the visualization of the process directly. This makes it easier for them to understand and remember the concepts being taught. Learning about the water cycle at RA Cahaya Insani is also often linked to everyday themes that are close to children's lives. For example, the teacher teaches the importance of conserving clean water while the children learn about water usage at home, such as washing hands or watering plants. The teacher connects this learning to the water cycle, explaining how the rainwater that falls will seep into the ground and become usable water. Science is not only taught as a collection of facts and concepts, but also as a means to instill moral and social values. For example, when studying the water cycle, children are taught the importance of not polluting water by throwing trash into rivers, so that the water remains clean and beneficial. The teacher provides real examples such as maintaining environmental cleanliness and conserving water. Evaluation of the use of animation media was conducted by observing children's responses, discussions, and follow-up activities that measure their understanding, such as drawing a simple water cycle. This shows that animated media is not only engaging but also effective in achieving science learning objectives.

CONCLUSION

Fundamental Finding : The research at RA Cahaya Insani demonstrates that animation media in science learning significantly enhances early childhood students' interest, comprehension, and engagement. By presenting abstract concepts like the water

cycle visually, animations effectively bridge gaps that verbal explanations often leave. This approach aligns with children's cognitive development, fostering not only better knowledge retention but also enriching emotional and social skills. **Implication :** The findings emphasize the potential of animation media as a transformative tool in early childhood education. By integrating visually engaging and developmentally appropriate animations, educators can achieve multifaceted learning outcomes. This method not only enhances comprehension but also promotes creativity and social interaction, highlighting the need for its widespread adoption in education. **Limitation :** The research acknowledges limitations, including challenges like restricted access to adequate facilities and occasional technical difficulties in implementing animation media. Furthermore, the study's scope is confined to specific science topics and a single learning environment, which may limit the generalizability of its findings to broader contexts. **Future Research :** Future studies should expand the application of animation media across diverse scientific themes to maximize its educational benefits. Longitudinal studies could provide deeper insights into the long-term cognitive and social impacts of this approach. Additionally, addressing technical and infrastructural challenges through innovative solutions could enhance the practical use of animation in various educational settings.

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