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Developing Critical Thinking Skills and Early Childhood Creativity through The National Geographic Kids App

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Abstract

Objective: This study aims to analyze the improvement of critical thinking skills and creativity in early childhood through the use of the National Geographic Kids digital application as an interactive learning medium in KB & Kindergarten Aisyiyah Pracimantoro. This research also aims to understand how the integration of digital media can create meaningful learning experiences that are appropriate for the development of children aged 5-6 years.

Methodology: This study used a descriptive qualitative approach involving 14 children of group B (7 boys and 7 girls), one classroom teacher, and five parents as supporting informants. The activity lasted for six weeks (September-October 2025) in three learning phases, namely introduction, exploration, and reflection. Data were collected through participatory observation, in-depth interviews, documentation of children's work, and Focus Group Discussions (FGDs). Data analysis is carried out through the process of condensation, presentation, and drawing conclusions.

Results: This study showed significant improvements in two main aspects. Critical thinking skills increased from 35.7% to 92.8%, indicated by the child's ability to ask questions, cause and effect reasons, and draw logical conclusions. Creativity increased from 28.6% to 78.6%, as seen in children's ability to produce original visual works and add personal ideas in drawing and digital games. The results of the FGD confirmed an increase in the child's focus, motivation, and active participation during the learning process.

Application/Originality/Value: This research makes a practical contribution to the development of early childhood learning through the application of targeted and interactive educational digital media. The National Geographic Kids app has proven to be effective in stimulating children's critical thinking and creativity through a fun and contextual approach to exploration.

Introduction

Early Childhood Education (PAUD) has a very important role as the main foundation in shaping children's learning abilities throughout life. At this level, learning focuses not only on mastering basic knowledge, but also on developing children's potential through fun and meaningful activities. In the 21st century, the world of education demands critical thinking, creativity, collaboration, and four-component communication skills known as the 4C Skills (B Trilling & Fadel, 2021). Therefore, the learning process in PAUD needs to be designed systematically, creatively, and in accordance with the child's developmental stage. In the golden age (*The Golden Age*), children are particularly vulnerable to various stimuli from the environment. Therefore, studying in PAUD does not only focus on memorization, but also needs to cultivate high-level thinking skills, especially critical thinking (Ansya & Salsabilla, 2025), (D. Ginting, Fitri, Mulyani, Ismiyani, & Sabudu, 2021).

Critical thinking is an important skill that needs to be developed from an early age because it helps children understand information logically, assess situations wisely, and make responsible decisions. In early childhood learning, critical thinking is seen when children are able to ask, observe, compare, and solve simple problems that arise from everyday experiences (Brookhart, 2022);(Hayati & Fitria, 2023). Children who have critical thinking skills tend to be more reflective, do not easily receive information without consideration, and are able to evaluate various possibilities before making decisions (Ennis, 2020). Through role-playing activities, simple experiments, and open discussions, teachers can stimulate children's ability to think more analytically and logically (Nusantara, D., Hartati, E., & Wulandari, R, 2024). This critical thinking ability is an important basis for children to develop creativity, because the two are interrelated in forming innovative and imaginative ways of thinking.

Creativity is the ability of children to come up with new things, imagine, and express ideas in an original way through various play and learning activities. In early childhood education, creativity is not only related to the results of work, but also to the thought process that encourages the child to try new things, look for alternative solutions, and express themselves freely (Runco & Acar, 2023). (Trilling & Fadel 2021) emphasizes that creativity, along with critical thinking, is part of the Skills *4C* which is essential to shaping reflective and innovative individuals in the 21st century. Creativity can be developed through activities that challenge children's imaginations such as drawing, storytelling, role-playing, or simple exploration-based projects (Maiyah, Wardhani, & Adwitiya, 2024). Creativity is an important part of the critical thinking process that helps children develop their potential, think independently, and be able to adapt to various situations in the future (Ansya & Salsabilla, 2025).

Critical and creative thinking skills are two interrelated aspects and are important to develop from an early age. Both of these abilities can grow optimally when children engage in learning that encourages exploration and problem-solving. Approaches such as *Project-based learning* and the STEAM curriculum has proven effective because it integrates science, technology, art, and real-world experiences into learning activities, so that children not only understand concepts, but can also use them creatively to solve challenges (Hastuti, I.B., Katoningsih, S., & Widyasari, 2025). The application of technology-based learning is a strategic means in developing critical and creative thinking skills in early childhood so that they are ready to face the changes and demands of the 21st century (Maiyah, Wardhani, & Adwitiya, 2024), (Ansya & Salsabill, 2025)

According to the Revised Bloom Taxonomy (Anderson & Krathwohl, 2001) Critical and creative thinking skills fall into the category *High-Order Thinking Skills (HOTS)* which includes the ability to analyze *(analyze),* Evaluate *(evaluate),* and make *(make).* In the context of early childhood, these abilities can be developed through play activities that challenge exploration, imagination, and simple problem-solving. Children who are able to analyze and evaluate information from an early age will have a strong foundation for logical and creative thinking at the next level. The use of digital technology is a strategic means in developing children's critical thinking skills and creativity (R. Ginting, Lestari, & Wijaya, 2021). Early childhood known as digital natives have become accustomed to interacting with technology, so digital-based learning media such as National Geographic Kids is relevant and effective.

Digital technology in the context of early childhood education now functions not only as a means of entertainment, but also as an interactive, engaging, and learning medium that helps children understand concepts in a more meaningful way (Hartawan, 2020);(Sulianta, 2020). Game-based learning, education, and interactive media have been shown to be effective in stimulating children's critical and creative thinking skills (Darmawan, Novita, & Hakim, 2024). In addition, the use of safe and targeted technology can increase children's involvement in the learning process and prevent them from the negative impacts of the digital world (Sitanggang, 2025). Teachers and parents need to collaborate in creating a learning environment that encourages children's exploration and creativity through educational digital media such as National Geographic Kids.

Application *Children of National Geographic* It is an effective digital educational medium for developing critical thinking skills and creativity in early childhood. Through interactive features such as educational videos, quizzes, science games, and illustrated articles, the app fosters children's curiosity and enthusiasm for learning (National Geographic Children, 2023). According to (Kucirková, 2020), digital media that encourages active exploration helps children understand complex concepts through engaging visual experiences. In addition, problem-solving-based features provide cognitive stimulation that supports the development of critical thinking and creativity. Research shows that the use of *National Geographic Kids* can create interactive, fun, and meaningful learning for children. This strategy not only trains critical and creative thinking skills, but also improves children's collaboration, communication, and curiosity about the world around them (Santoso & Wirahno, 2022);(Asmara, Judijanto, Hita, & Saddhono, 2023).

This research was conducted at KB Aisyiyah Pracimantoro, especially in class B. Application *National Geographic Kids* used as a digital learning medium to stimulate children's critical thinking skills and creativity. Children are invited to explore a variety of topics such as animals, nature, and the environment through videos, quizzes, and educational games that encourage them to ask questions, observe, and think analytically. Previous research by (Asmawulan & Santoso, 2023) shows that the use of interactive digital media can improve children's critical thinking skills and curiosity, while (Asmara, N., Widodo, R., & Dewi, P, 2023) emphasizing that visual education applications are able to foster early childhood creativity. However, the use of the app *National Geographic Kids* Teachers still need help so that children are not only passive users, but actively involved in thinking, discussing, and creating meaningfully. The application of digital media is a relevant strategy to support 21st century learning that emphasizes the development of critical thinking skills and creativity from an early age. In addition, this research is expected to make a theoretical contribution to the development of digital-based learning models that are in accordance with the theories of Bloom, Vygotsky.

Method

This study uses a descriptive qualitative approach, with the aim of describing the process of improving children's critical thinking skills and creativity through the application of the National Geographic Kids application. This approach allows researchers to understand the meaning of children's behaviors and interactions during the learning process naturally without manipulating variables (Moleong, 2021).

This research was carried out at KB Aisyiyah Pracimantoro, which is located in Sumberalit Hamlet, Sedayu Village, Pracimantoro District, Wonogiri Regency. This location was chosen because the institution has utilized digital devices such as laptops and tablets in learning activities and has teachers who have a good understanding of the use of digital educational media. The study subjects consisted of 14 children of group B aged between 5-6 years, with a composition of 7 boys and 7 girls. In addition to children, this study also involved 1 classroom teacher and 5 parents as supporting informants to provide additional data through interviews and *Focus Group Discussions (FGD).*

The study lasted for six weeks, starting in September to October 2025, and was divided into three main phases. The introduction phase (weeks 1–2) is the initial introduction and adaptation phase, where children are introduced to basic features in *the National Geographic Kids app* such as educational videos, quizzes, and *puzzle games.* In this phase, children begin to show curiosity about digital media and adapt to new interactive ways of learning. The exploration phase (weeks 3–4) focuses on the exploration of learning activities. Children begin to be actively involved in answering quizzes, playing maze features, and discussing with teachers about video events. The researchers noted how children began to demonstrate critical thinking skills through asking questions, explaining reasons, and analyzing the impressions they saw. Next, the reflection phase (weeks 5–6) is directed at reflection and evaluation of improving creativity and critical thinking skills. Kids can produce independent works, such as drawing animals from shows or creating original visual stories based on learning experiences from apps.

Data was collected through four main techniques, namely participatory observation, in-depth interviews, documentation, and *Focus Group Discussions (FGD).* Observations are made during classroom learning activities to record children's behavior in terms of critical thinking skills and creativity. Interviews were conducted with teachers, parents, and children to explore their perceptions of learning using digital media. Teachers provide views on the development of children's thinking and creativity, while parents explain changes in children's behavior at home after learning activities with apps. Documentation includes children's work, photos of learning activities, notes of teacher reflections, and screenshots of in-app activities.

In addition, the FGD was held at the end of the sixth week by involving 1 teacher and 5 parents to discuss the effectiveness of using *the National Geographic Kids application* in early childhood learning. This discussion also discussed technical challenges such as device limitations and internet connection stability, as well as mentoring strategies carried out by parents so that children stay focused and get maximum benefits from the use of digital media.

The data obtained was then analyzed using an interactive model (Miles & Huberman, 2020), which consists of three stages, namely data condensation, data presentation, and conclusion or verification. The analysis process was carried out repeatedly by examining the results of observations, interviews, documentation, and FGD to find patterns of development of children's critical thinking skills and creativity. The validity of the data is maintained through triangulation of sources, member checking, and peer discussion with teachers and research colleagues, to ensure that the interpretation of research results is in accordance with actual conditions in the field.

INDICATORS AND RUBIK'S CUBES

To assess the development of children's critical thinking skills and creativity, the researcher compiled a qualitative observation rubric that was used during the six weeks of learning. This rubric was developed based on the Revised Bloom Taxonomy (Anderson & Krathwohl, 2001) and early childhood development indicators from Permendikbud PAUD 137/2014, which has been adjusted to the characteristics of digital media.

1. **Critical Thinking Aspects**
    a. Indicator 1: Children are able to ask questions based on educational impressions.
        1) A score of 1 indicates that the child is still passive and has not asked questions.
        2) A score of 2 is given if the child asks questions after being directed by the teacher.
        3) Score 3 if the child asks spontaneously even though it is still simple.

4) A score of 4 shows that children ask spontaneous questions with logical reasons according to the content of the show.

b. Indicator 2: Children are able to give reasons or explain cause-and-effect relationships.
   1) Score 1: The child is unable to answer the question.
   2) Score 2: The child only gives factual answers.
   3) Score 3: The child gave a simple reason, although it was not complete.
   4) Score 4: The child is able to give logical and contextually relevant reasons.

2. Creativity Aspect

a. Indicator 1: Children show originality in drawing or playing digitally.
   1) Score 1: The child fully imitates the work of the example.
   2) Score 2: The child adds a little variety without changing the main idea.
   3) Score 3: The child changes some of it with his own ideas.
   4) Score 4: The child creates unique and imaginative works that are different from the teacher's examples.

The assessment was carried out by direct observation and triangulation with the results of interviews with teachers and parents. Each score is recapped weekly to see patterns of improvement in the child's abilities from the first week to the sixth week. The percentage that appears in the results section is the ratio of the number of children with a score of at least 3 to the total subjects (14 children).

Result

This research was conducted at KB & TK Aisyiyah Pracimantoro, Sumberalit Hamlet, Sedayu Village, Pracimantoro District, Wonogiri Regency for six weeks (September-October 2025) with a focus on improving critical thinking skills and creativity in early childhood through *the National Geographic Kids digital application* as an interactive learning medium. The subjects of the study consisted of 14 children of group B (7 boys and 7 girls) aged 5-6 years, as well as one classroom teacher and five parents as supporting informants. Data were obtained through classroom observations, interviews with teachers, children, and parents, as well as documentation of children's photos and works during learning activities.

1. Improvement of children's critical thinking skills

Critical thinking skills are observed through children's activities when watching educational videos, answering quizzes, and completing interactive games with nature and animal themes in the National Geographic Kids application. Data were obtained from weekly observation records and interviews with teachers and parents. The percentage increase was calculated based on the number of children who achieved a score of ≥3 from the critical thinking observation rubric (see Table 1), divided by a total of 14 children, and then converted into a percentage. This means that if 9 children reach the category of "able to give logical reasons", then the percentage is $(9 \div 14) \times 100\% = 64.3\%$.

a. Phase 1 (Weeks 1–2) – Early Introduction and Adaptation

A total of 5 children (35.7%) showed early signs of critical thinking by starting to ask questions about the content of the video such as "Why are whales big?" or "Why can birds fly?". The children seemed enthusiastic but were still waiting for the teacher's direction. The teacher notes that the child's curiosity arises naturally, although most of the questions are still factual.

The results of the Teacher Interview stated that:

"The children seem very enthusiastic. They began to dare to ask questions even though the questions were still simple."

Parent Interview Results:

Most parents observe that children often tell what they see from home apps, such as, *"My child said that lions live in pastures and not in forests."*

Children's Interview Results:

The boy said he enjoyed watching the video because he could see *"animals that have never been seen on TV."*

b. Phase 2 (Weeks 3–4) – Simple Exploration and Analysis

A total of 9 children (64.3%) began to demonstrate analytical thinking skills by giving reasons for their answers. For example, when answering the quiz "Why can't fish live on land?", the child answers, "Because fish need water to breathe." In addition, in maze games, children start trying different directions and discussing them with friends.

Teacher Interview Results:

The teacher mentioned, *"Children start thinking before they act, trying different paths in maze games."*

Parent Interview Results:

Seven out of ten parents say their children start asking logical questions, such as why certain animals live in the sea or on land.

c. Phase 3 (Weeks 5–6) – Reflection and Logical Reasoning

A total of 13 children (92.8%) were able to deduce the meaning of the show well and explain the cause-and-effect relationship, *such as "If the sea is dirty, the fish can't swim."* The teacher noted that children can now respond to the opinions of their peers in a polite and critical way.

Teacher Interview Results:

The teacher said, *"Now children can explain the cause and effect of the story without having to be provoked."*

Parent Interview Results:

Ten out of fourteen parents said that their children start thinking before acting, for example advising their younger siblings not to throw garbage in the water.

Table 1. Children's Critical Thinking Development During Learning Activities

Learning Stage	Description and Percentage of Children Who Show Ability
Weeks 1–2 (Early Introduction Stage)	A total of 5 children (35.7%) began to show curiosity by asking simple questions while watching videos.
Weeks 3–4 (Basic Analysis Stage)	There was an increase to 9 children (64.3%) who began to be able to give logical reasons and compare information between videos.
Weeks 5–6 (Reflection and Reasoning Stage)	This increased to 13 children (92.8%) who were already able to draw simple conclusions and express their opinions with confidence.

The above figures come from the results of participatory observation during learning activities which are confirmed through interviews and FGDs with teachers and parents.

2. Increased Children's Creativity

Creativity was observed through the activities of putting together *digital puzzles* and redrawing animals displayed in *the National Geographic Kids app.* The focus of observation includes the child's ability to generate new ideas, flexibility of thinking, and originality in developing visual works.

a. Phase 1 (Weeks 1–2) – Initial Exploration

A total of 4 children (28.6%) began to try to put together puzzles and change the color of the picture according to their imagination. For example, a child says, *"I want to give you purple so that the shark is cute."* Most of the children still imitate the teacher's example but show high spirits.

Teacher Interview Results:

The teacher noted that the child began to experiment with color even though he still needed direction.

Parent Interview Results:

Parents say that children at home are starting to draw animals from apps in different colors *"so they don't get bored."*

b. Phase 2 (Weeks 3–4) – Imagination Development

A total of 7 children (50%) started adding ideas in their drawings, such as creating a story setting or additional characters. For example, *"Fish swim into caves because they are afraid of sharks."* Children also start collaborating with friends while putting together *puzzles.*

Teacher Interview Results:

Teachers judge that children are more expressive and begin to have *"characteristics"* in drawing.

Parent Interview Results:

Children often ask for extra paper at home to draw "*their own version" of the animal.*

c. Phase 3 (Weeks 5–6) – Originality and Independence

A total of 11 children (78.6%) were able to create original works without imitating the teacher's example. The child added visual stories such as *"Turtle drives a plane into an iceberg."*

Teacher Interview Results:

The teacher said, *"Every child has his own ideas. No job is the same."*

Parent Interview Results:

Almost all parents say that their children seem more creative and confident in showing their pictures.

Table 2. Children's Creativity Development During Learning Activities

Learning Stage	Description and Percentage of Children Who Show Ability
Weeks 1–2 (Early Exploration Phase)	A total of 4 children (28.6%) started trying puzzle and coloring features, although most still imitate the teacher's example.
Weeks 3–4 (Imagination Development Phase)	There was an increase of 7 children (50%) who started adding new ideas to their work while expressing the story visually.
Weeks 5–6 (Originality Phase)	This increased to 11 children (78.6%) who were able to create unique works with new color combinations and storylines without imitating teachers.

The above data is taken from observation sheets and documentation of children's works confirmed through interviews with teachers and parents.

The results of the Focus Group Discussion (FGD) held in the sixth week of the study involving one grade B teacher and five parents showed that the use of *the National Geographic Kids application* had a positive impact on the early childhood learning process. The activity, which lasted for approximately 90 minutes in the teacher's room of KB Aisyiyah Pracimantoro, highlighted three main aspects, namely the effectiveness of the use of applications in learning, changes in children's behavior, and challenges in digital media assistance.

Based on the results of the discussion, the teacher said that the use of the application increased children's involvement and focus in learning. Children who usually lose attention quickly during conventional learning become more enthusiastic and last longer when interacting with educational events. The teacher also added that children seem more active and excited when learning with images and sounds from the app, as well as showing quick reactions when looking at animals and trying to retell what they saw.

Parents confirmed the findings by stating that *the National Geographic Kids app* helps children get to know different types of animals and environments in a fun way. Children are becoming more and more aware of video content and showing a new interest in nature. One parent even revealed that at first they thought their child was just playing games, but it turned out that the child learned a lot and was able to remember information about animals such as lions, whales, and elephants with enthusiasm.

However, several obstacles were also found, such as unstable internet connection problems, limited parental time in accompanying children, and concerns about excessive use of gadgets. However, both teachers and parents agree that with the right mentoring, the use of *the National Geographic Kids application* still has a positive impact on children's motivation, enthusiasm, and learning behavior.

Figure 1. Classroom Teacher Interview

Figure 2. Parent Interview of Child

Figure 3. Kids Interact with Apps

Discussion

The results of this study show that the use of the National Geographic Kids application has a positive effect on improving critical thinking skills and creativity in early childhood. This digital media-based activity successfully combines interactive learning, visual exploration, and thematic narrative in accordance with the characteristics of early childhood learning. Children not only become passive recipients of information, but also actively interpret, analyze, and express ideas through visual and verbal activities.

1. Development of Children's Critical Thinking Skills

Based on the results of observations and interviews, children's critical thinking skills gradually increased from the beginning to the end of the activity. In the preliminary phase (weeks 1–2), children begin to show curiosity and ask questions about the content of the video, such as "Why are whales big?" or "Why

do birds fly?". This points to the emergence of curiosity-driven learning, which is the main foundation of critical thinking (Andriopoulos, 2022)

In the exploration phase (weeks 3-4), children begin to relate new knowledge to familiar concepts, such as explaining the reasons why fish cannot live on land. This process demonstrates the child's ability to build simple cause-and-effect reasoning, in line with a constructivist approach that emphasizes that children's understanding develops through exploration and direct experience (Lestari, 2020; Kurniawati & Pramitasari, 2022).

Entering the reflection phase (weeks 5-6), most children (92.8%) are able to draw simple conclusions and explain the relationships between concepts. The teacher noted that children can now dialogue and express opinions logically. These findings are in line with research (Andriani and Rakimahwati 2023), which shows that the use of interactive digital media can train children's ability to observe, compare, and infer information independently.

In addition, the results of the interviews showed that there was a consistency between the teacher's observation and the child's behavior at home. Children who actively ask questions at school also tend to tell their parents about the content of videos or natural phenomena. This shows that National Geographic Kids' app-based activities reinforce the transfer of learning from the school context to the home. These findings are in line with Kucirkova's (2021) study, which confirms that children's interaction with educational digital media can expand their critical thinking space through multimodal experiences (visual, auditory, and narrative).

The improvement of children's critical thinking skills can be seen from the tendency of children to be more active in asking questions and providing logical explanations for observed phenomena. Based on the theory of Revised Bloom Taxonomy (Anderson & Krathwohl, 2001), this ability shows a transition from the level of basic thinking (remember–understanding) to the level of high thinking (analyze–evaluate). Children not only receive information passively, but begin to analyze cause-and-effect relationships and draw simple conclusions.

The results of interviews with teachers and parents reinforced these findings. Children begin to question environmental concepts such as the cleanliness of the ocean or animal habitats, which indicate a reflective thought process. This is in line with the theory (Vygotsky, 1978) about *Proximal Development Zone (ZPD),* which explains that children's cognitive development will improve when they get support (scaffolding) from teachers or more competent adults. Teachers play an important role in directing discussions and providing context to digital impressions so that children are able to build more logical reasoning.

2. Children's Creativity Development

Children's creativity also experienced a significant increase during the six weeks of implementation. In the early phases, children begin to experiment with colors and shapes even though they are still imitating the teacher's example. This marks the early stage of creativity development, where children learn through the process of imitation before being able to create independently, as explained by (Crafts, 2023) that creativity in early childhood grows through opportunities to imitate, explore, and modify their learning experiences.

In the developmental phase (weeks 3-4), children begin to add their own ideas in digital drawings or puzzles, such as describing "fish swimming into a cave because they are afraid of sharks." This kind of activity demonstrates the child's ability to combine imagination and visual experience in a symbolic form, as demonstrated by (Runco & Acar, 2023) that early childhood creativity arises from the freedom to experiment and think differently.

In the originality phase (weeks 5–6), as many as 11 children (78.6%) were able to produce unique and independent visual works, such as depicting a flying turtle or an animal traveling to an iceberg. This reinforces previous findings that exploration-based digital media encourages children to think non-linearly and express their own creative identities (Jenkins, Ito, & Boyd, 2021). Teachers and parents also reported significant changes in children's behavior, especially in terms of confidence and motivation to work. Children are more courageous to show their work and tell their stories with confidence. These results support the

findings (Lestari, 2024) that digital media designed with compelling narrative and visual elements can strengthen children's creative agency and improve their visual and verbal communication skills.

The results of *the Focus Group Discussion (FGD)* strengthened the observation and interview data. Teachers and parents state that National Geographic Kids makes children more focused, active, and engaged in learning. Children not only watch, but also discuss the content of the show and connect it with the real world. This is in line with the opinion (Donohue & Schomburg, 2021) which emphasizes that the effectiveness of digital media for early childhood is highly dependent on the active role of teacher and parent mentoring.

However, challenges also arise, such as limited internet connections and time to accompany parents at home. However, collaboration between teachers and parents is the main key in maintaining a balance between digital learning and *hands-on learning.* These results show the importance of *Blended learning* In early childhood education, a combination of digital media and concrete game-based learning as recommended by (UNICEF, 2022) for the context of early childhood education in the digital era.

Overall, the results of this study show that learning to use *the National Geographic Kids app* not only improves children's thematic knowledge, but also forms reflective, creative, and logical thinking from an early age. Children's creativity skills increase as they engage in drawing, puzzle playing, and retelling digital impressions. Children showed the courage to experiment with colors and shapes, as well as create original visual works of "fish dancing in the blue sea". This phenomenon describes the stages of create thinking in Bloom's Taxonomy, which is the ability to create something new based on the understanding that has been obtained.

According to (B Trilling & Fadel, 2021) Creativity is one of the key components of 21st century skills *(21st Century Skills)* which needs to be instilled early because it plays a role in forming individuals who are innovative, reflective, and adaptive to change. In this context, the use of digital media such as National Geographic Kids has been proven to be able to stimulate children's imagination through visual and interactive experiences.

These results are also in line with the research (Saddhono, Hita, & Asmawulan, 2023) which confirms that interactive visual media can enhance the creative expression of early childhood children, especially when learning activities are associated with real-life contexts. The process of digital play accompanied by teachers makes children not only imitate, but also modify ideas into new forms according to their imagination. In addition, Vygotsky's theory asserts that children's creativity develops in social contexts where interactions with peers and teachers enrich the experience of thinking. In group activities in the classroom, children discuss, collaborate, and display their work in front of friends, which strengthens the communication and collaboration aspects of two important competencies in 21st century learning.

3. Theoretical and Practical Implications

The findings of this study provide an implication that interactive digital media can be used as an effective learning tool to develop higher order thinking skills in early childhood, as long as its use is directed with a humanistic and constructivistic approach. Theoretically, this study expands the application of Bloom and Vygotsky's theory in the context of digital learning in Indonesian PAUD. Practically, this study emphasizes the importance of the role of teachers and parents in accompanying children so that the use of technology is not only entertainment, but also a vehicle for exploration and creation of meaning.

Conclusion

This study shows that the use of the National Geographic Kids application effectively improves critical thinking skills and creativity in early childhood in KB & Kindergarten Aisyiyah Pracimantoro. Children become more active in asking questions, reasoning, and drawing simple conclusions from the impressions they observe. Through interactive activities such as puzzles and digital drawing, children are able to express new ideas in an original way and dare to experiment with colors and shapes. The results of the FGD with teachers and parents reinforced these findings, where this application-based learning made children more focused, enthusiastic, and motivated to learn. Despite

obstacles such as limited mentoring time and internet connections, collaboration between teachers and parents has proven to be an important factor that supports the success of digital learning. Thus, digital media such as National Geographic Kids not only functions as a means of entertainment, but also as a meaningful learning tool that is able to foster analytical skills, logical reasoning, and creativity in early childhood.

Theoretically, the results of this study strengthen the application of the Revised Bloom Taxonomy in the context of digital learning, showing that early childhood is able to achieve a high level of thinking through interactive play activities. In addition, these findings also support Vygotsky's view of the importance of social scaffolding, where interaction with teachers and parents is key for children to develop their critical and creative thinking potential. Thus, digital learning designed according to the principles of 21st century skills (4C) can be an effective strategy in shaping a generation that is reflective, innovative, and adaptive to the changing times.

The next research is suggested to develop educational applications based on local culture so that the values of the nation's wisdom can be integrated in early childhood digital learning. In addition, the application of *the STEAM (Science, Technology, Engineering, Art, and Mathematics)* approach is expected to expand the development of children's critical and creative thinking skills through fun exploratory activities. Future research also needs to involve more PAUD institutions with diverse social and geographical backgrounds, so that the results are more representative and can strengthen the application of contextual digital learning in Indonesia.

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