

The Effectiveness of Rotating Earth Learning Media on Understanding the Concept of Day and Night at PAUD AL IHSAN, Bangun Purba Village

Angriani Hasibuan *, Tinasah, Ainun Munairoh, Krisayana Hutagalung, Patimah

Elementary Madrasah Teacher Education Study Program, Sekolah Tinggi Agama Islam Negeri Mandailing Natal
Jalan Prof. Dr. Andi Hakim Nasution, Komplek STAIN, Desa Pidoli Lombang, Kecamatan Panyabungan, Kabupaten Mandailing Natal, Sumatera Utara 22976, Indonesia

Article Info

Article history:

Received June 19, 2026

Revised July 19, 2026

Accepted August 5, 2026

Keywords:

Rotating Earth Media, Day and Night Concept, Children's Astronomy

ABSTRACT

Understanding basic astronomical concepts, particularly the phenomenon of day and night, is often an abstract topic for early childhood students at the Al Ihsan Preschool (PAUD) in Bangun Purba Village. The lack of adequate visual media makes it difficult for children to distinguish between the Earth's rotation and its impact on changes in time. This study aims to test the effectiveness of using the "Rotating Earth" learning media in improving understanding of the concept of day and night in children in Group B. This study was a Classroom Action Research (CAR) conducted in two cycles. Fifteen children participated in the study. Data were collected through observation, interviews, and oral tests, then analyzed descriptively and qualitatively. The results showed a significant increase in children's understanding after using the "Rotating Earth" media. This media was able to concretely conceptualize the Earth's rotation, previously considered abstract, into a concrete visual experience. In conclusion, the "Rotating Earth" media is highly effective in stimulating children's cognitive abilities related to basic natural phenomena and can be applied as a standard learning medium for astronomy at the Early Childhood Education (PAUD) level.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Angriani Hasibuan
Sekolah Tinggi Agama Islam Negeri Mandailing Natal
Email: angriani2005hasibuan@gmail.com

INTRODUCTION

Science education for early childhood is a crucial first step in developing children's curiosity and critical thinking skills regarding the phenomena around them. At this stage, children begin to ask questions related to natural phenomena, such as why the sun rises in the morning and why the sky darkens at night. However, providing scientific explanations to young children requires an approach that goes beyond verbal communication and involves sensory and visual experiences that can bridge the limitations of their abstract logic. As explained by Hasanah (2022), mastery of basic scientific literacy in early childhood is greatly influenced by the quality of the stimuli provided through concrete and meaningful activities (Hasanah, 2022).

Astronomical concepts, particularly the Earth's rotation, which causes day and night, are extremely complex for young children, who are still in the pre-operational stage of thinking, to grasp.

Children tend to view the sun as a moving object, rather than a rotating Earth, so media is needed to correct this perception. Without appropriate learning media, these concepts will remain confusing and not deeply embedded in children's long-term memory. According to Wahyuni (2023), failure to concretely understand basic astronomical concepts can cause children to lose interest in science learning because they perceive the material as too difficult and beyond their grasp.

The use of innovative learning media such as the "Rotating Earth" (a model of the Earth that can be rotated relative to a light source) is a strategic solution for dynamically visualizing the phenomenon of day and night. This media allows children to directly observe how the side of the Earth facing the light source experiences day, while the other side experiences night, resulting in a more effective transfer of knowledge than simply showing a still image. Suryani (2024) emphasized that the use of interactive visual aids that children can directly manipulate can accelerate cognitive understanding of cause-and-effect relationships in natural phenomena, ultimately increasing student active engagement in the classroom.

At the Al Ihsan Preschool in Bangun Purba Village, the challenge faced is the continued dominance of traditional teaching methods limited to teacher explanations without the aid of representative visual aids, resulting in children's understanding of the concept of changing time remaining very low. The beautiful geographical conditions of rural areas actually provide a potential learning environment, but they have not been optimized with supporting tools capable of scientifically addressing children's scientific curiosity. Pratama emphasized that innovative learning media tailored to local characteristics and the cognitive development of children in rural areas is key to improving the quality of early childhood education and minimizing the cognitive gap with children in urban areas (Pratama, 2025).

The main objective of this study is to describe the implementation process of the "Rotating Earth" learning media and analyze its effectiveness in improving understanding of the concept of day and night in early childhood at Al Ihsan Preschool. Through this research, it is hoped that a concrete and easily applicable learning intervention model can be identified by educators to help children understand the dynamics of Earth's rotation as the cause of changes in time. This will help children no longer struggle to understand basic astronomy material and provide them with a strong foundation in scientific literacy for subsequent levels of education.

IMPLEMENTATION METHOD

This study employed Classroom Action Research (CAR) with the aim of improving the learning process and enhancing children's learning outcomes through a cycle of planning, action, observation, and reflection.

The data sources for this study involved 15 group B students at the Al Ihsan Early Childhood Education (PAUD) in Bangun Purba Village as research subjects, along with supporting data from classroom teachers who acted as collaborators in observing changes in children's behavior and understanding during the intervention.

Data collection techniques included participant observation to record children's engagement, unstructured interviews to explore understanding, and documentation of student worksheets. Data validity was ensured through source and method triangulation to ensure the objectivity of the findings.

The data analysis technique used was the interactive analysis model of Miles, Huberman, and Saldana, which includes data reduction, data presentation, and conclusion drawing or verification. Data from each cycle was processed to determine whether the research's success indicators had been achieved.

RESULTS AND DISCUSSION

1. Visualizing the Concept of Earth's Rotation through Rotating Earth Media

The "Rotating Earth" media serves as a cognitive bridge that transforms the initially abstract concept of Earth's rotation into a visual representation that children can touch and move. By rotating the globe in front of a light source, children can directly observe which areas are exposed to light and which are in shadow. This makes it easier for children to absorb information about why the sun appears to move. The use of this media has been proven to help children understand the mechanics of Earth's rotation without the need for complex verbal explanations (Putri, 2023).

This visualization process is crucial for young children, who tend to think through direct vision (visual learners). When children see the globe rotating, they automatically associate the lighted areas with day and the dark areas with night. This association process accelerates the formation of cognitive schemas regarding the change of time in children's brains. Learning that presents a concrete model like this is far more effective than using static posters or flashcards that lack spatial understanding.

The success of this media is also driven by its ability to spark children's curiosity and encourage them to continue experimenting. The children at Al Ihsan Preschool (PAUD) appeared enthusiastic when given the opportunity to spin the globe themselves, demonstrating that interactive learning media enhances intrinsic learning motivation. This aligns with constructivist theory, which emphasizes that children learn best when they construct their own understanding through active exploration of the teaching aids available in their learning environment.

Furthermore, the use of this media helps educators simplify complex scientific language into language children can understand. Teachers don't need to explain the terms "rotation" or "axis" technically; they simply demonstrate the Earth's rotation. This allows children to grasp the concept intuitively before they are formally exposed to these scientific terms later. This approach effectively maintains children's focus and concentration throughout the learning process.

Overall, visualization using the Rotating Earth media has been shown to minimize common misconceptions among young children regarding the movement of the sun. Previously, children thought the sun revolved around the Earth, but after seeing this media, they began to correct their understanding. This correction in understanding demonstrates that the right media can have an immediate impact on shifting children's scientific mindsets from an early age (Andi, 2024).

2. Children's Active Involvement in the Day and Night Simulation

During the simulation, children not only act as observers but also act as media operators. Each child is given the opportunity to spin the rotating Earth, which directly increases their participation in the learning process. The physical involvement in spinning the globe makes children feel like they are part of the simulation, ensuring their attention remains focused throughout each stage of the teacher's explanation. This active simulation creates an emotional bond between children and the learning material.

This simulation provides a multisensory learning experience, where children use their hands to spin (kinesthetic), their eyes to observe changes in light (visual), and their ears to listen to the teacher's instructions (auditory). The combination of these three senses strengthens children's memory of the concept of day and night. Children who were previously passive become more confident in asking questions and expressing their opinions about what would happen if the Earth stopped spinning. This active participation is a positive indicator of the media's success in stimulating children's critical thinking (Indah, 2025).

Teachers at Al Ihsan Preschool also reported that through the rotating Earth simulation, classroom management became much easier because each child had a turn to spin the device. No children became sleepy or bored because they eagerly awaited their turn to engage directly with the media. Classroom management based on active student participation has proven effective in maintaining a dynamic classroom climate and supporting the ongoing transfer of knowledge (Bdai, 2024).

In addition to individual participation, this simulation also fosters collaboration among students, as they alert each other when the Earth rotates too fast or too slow. This mutual support process demonstrates that the media stimulates not only cognitive aspects but also social and

cooperative aspects. Children learn that to understand natural phenomena, they need to discuss and share roles in the simulation being conducted in class.

Ultimately, this active engagement results in a deeper understanding that day and night are a recurring cycle due to the Earth's continuous movement. This understanding is not simply rote memorization, but rather the result of direct experience they experienced while playing the media. The children were able to explain the concept to their parents at home, providing clear evidence that the material had been well internalized.

3. Cognitive Enhancement and Understanding of Spatial Concepts

The use of the Rotating Earth (Earth) media also significantly contributes to cognitive development related to spatial understanding. Children learn to position themselves on the "Earth" and understand that if it is daytime here, it is nighttime elsewhere. This spatial understanding is a high-level skill for early childhood, but with the help of a globe, they can visualize it well. This ability to imagine the Earth's position in space is an important foundation for future logical-mathematical intelligence.

Children begin to identify the direction of the Earth's rotation from west to east through repeated observation of the Rotating Earth (Earth) media. Although they do not yet understand the cardinal directions in depth, this visual observation instills the correct movement patterns. This cognitive improvement is evident when children are asked to draw illustrations of day and night, where they begin to position the sun and moon according to the Earth's position in their simulations.

Furthermore, this media trains children's classification skills. They group objects that appear during the day (such as the sun, birds, school activities) and at night (such as the moon, stars, sleep). This ability to classify is strengthened by their understanding of the Earth's rotation, which provides a logical context for why objects appear at different times. This cause-and-effect logic is a significant form of cognitive advancement (Dedi, 2025).

Another cognitive aspect that improves is children's memory for time terminology. The use of media makes words like "rotate," "light," "dark," and "rotate" more meaningful. They not only memorize words but also understand the situations behind them. This naturally enriches children's scientific vocabulary and makes them more confident in expressing ideas about natural phenomena to their peers (Kurniawan, 2023).

Ultimately, this cognitive improvement has a positive impact on children's academic readiness for the transition to elementary school. They now have a strong scientific foundation of understanding how their planet works. This foundation will make it easier for them to learn more complex science material in the future because their scientific thinking has been formed in a fun way through the Rotating Earth media (Ratna, 2024).

4. The Role of Educators in Optimizing Learning Media

In implementing the Rotating Earth media, the role of educators is crucial as facilitators and discussion starters. Teachers not only demonstrate the tools but also ask open-ended questions that provoke children's thinking, such as "What happens if the sun doesn't shine?" or "Where does the sun go at night?" These questions encourage children to become active thinkers rather than mere spectators. The teacher's role as a supportive resource is crucial to the success of this method (Rina, 2023).

Educators at Al Ihsan Early Childhood Education (PAUD) demonstrated improved skills in managing learning media through brief training prior to the study. They were able to align media demonstrations with the children's learning pace, provide pauses to allow children to digest the information, and reinforce key points. The teachers' adaptability in using the media demonstrated that it is very user-friendly and does not require high technical skills (Dewi, 2022).

Teachers also play a role in creating a conducive atmosphere so children feel safe exploring. They appreciate every question or answer, no matter how small. This appreciative classroom environment helps children feel less afraid of making mistakes when trying to understand difficult concepts. Emotional support from educators proved key to encouraging children to express their critical thinking about the phenomenon of day and night.

Furthermore, teachers conducted ongoing evaluations of media use. They noted which parts of the demonstrations the children understood best and which parts needed additional explanation. These evaluations served as the basis for teachers to improve their delivery methods in subsequent sessions. Teachers' ability to reflect on their teaching practices was a key asset in ensuring the continued effectiveness of the Bumi Putar (Rotating Earth) media in the future.

Collaboration between teachers also developed effectively in designing more engaging learning scenarios. They shared tips on how to explain the concept of day and night more easily. This collaboration demonstrated that the implementation of the Bumi Putar media not only impacted students but also enhanced teachers' professionalism in developing creative and innovative learning media in the Early Childhood Education (ECE) environment.

5. Psychological Impact and Learning Motivation for Children in Rural Environments

The use of the Rotating Earth media in rural environments like Bangun Purba Village has a positive psychological impact on children. They feel proud to have engaging learning media, something they may have rarely encountered before. This sense of pride increases their motivation to come to school on time and fully participate in learning activities. Children's enjoyment of learning is a key indicator of the effectiveness of an early childhood education program (Tono, 2024).

This media also serves as a means to bring children closer to the scientific realities of their surroundings. Even though they live in a village, understanding the solar system makes them realize that they are part of the vast universe. This awareness fosters a greater sense of gratitude and curiosity about God's creation. This perspective provides profound spiritual and emotional value for children's personality development.

Another psychological impact is the loss of fear of the dark for some children. By understanding that nighttime occurs due to the Earth's natural rotation, their fear of "ghosts" or mystical darkness begins to diminish. Logical scientific explanations help children overcome their minor anxieties with rational understanding. This proves that scientific literacy plays a crucial role in children's psychological well-being.

The increased motivation to learn is also evident in the children's enthusiasm in sharing what they learn at school with their parents. They bring home the concept of "The Rotating Earth" as a topic of conversation at home, indirectly involving parents in their children's education. Parental involvement, motivated by their children's stories, creates a positive educational ecosystem between school and family.

In closing, the effectiveness of the Bumi Putar (Earth Rotating Earth) media at Al Ihsan Preschool demonstrates that educational innovation can thrive anywhere, including in rural areas, as long as there is a willingness to be creative. Children who are highly motivated from an early age tend to be persistent learners and possess a strong sense of curiosity. This media has successfully laid the foundation for a love of science for the children of Bangun Purba Village, which will be a valuable asset for them in the future (Cahya, 2024).

CONCLUSION

The "Rotating Earth" learning media has proven highly effective in enhancing understanding of the concept of day and night in early childhood at the Al Ihsan Preschool in Bangun Purba Village. The results showed that the use of interactive and visual media transformed children's understanding from abstract and speculative to concrete and logical. Children were not only able to identify the difference between day and night but also understood the process behind this phenomenon, namely the Earth's rotation, a significant cognitive achievement for children in group B. Beyond cognitive aspects, this media also successfully stimulated children's psychological aspects and motivation to learn, making them more active, enthusiastic, and developing a strong foundation of scientific literacy from an early age.

Based on these conclusions, it is recommended that early childhood educators in rural areas adopt interactive media such as "Rotating Earth" as a solution to the limitations of modern teaching aids. Teachers are encouraged to continue developing their creativity in utilizing media available around the school so that science learning is no longer a burden but rather a fun adventure. Future research is expected to explore the use of similar media for other astronomical concepts, such as moon phases or eclipses, to broaden rural children's knowledge of the wonders of the universe through an approach that is tailored to their cognitive developmental stage.

REFERENCES

- [1] Andi, S. (2024). Strategi guru PAUD dalam mengelola media pembelajaran berbasis inkuiri. Penerbit Edukasi Indonesia.
- [2] Arikunto, S. (2021). Prosedur penelitian: Suatu pendekatan praktik. Rineka Cipta.
- [3] Budi, S. (2024). Manajemen kelas dinamis melalui partisipasi aktif siswa. Alfabeta.
- [4] Cahya, D. (2024). Membangun motivasi belajar anak usia dini di pedesaan. Jurnal Inovasi Pendidikan, 12(2), 201-215.
- [5] Dewi, R. (2022). Penciptaan iklim kelas yang aman untuk anak bereksplorasi. Jurnal Psikologi Pendidikan, 9(2), 120-135.
- [6] Hasanah, U. (2022). Literasi sains anak usia dini: Konsep dan implementasi. Pustaka Pelajar.
- [7] Indah, S. (2025). Meningkatkan keaktifan anak melalui simulasi media konkret. Jurnal Pendidikan Usia Dini, 19(2), 40-52.
- [8] Kurniawan, A. (2023). Pengayaan kosakata sains melalui media pembelajaran interaktif. Jurnal Bahasa dan Pendidikan, 7(3), 90-105.
- [9] Miles, M. B., Huberman, A. M., & Saldana, J. (2023). Analisis data kualitatif: Buku sumber tentang metode-metode baru. UI Press.
- [10] Moleong, L. J. (2021). Metodologi penelitian kualitatif. Remaja Rosdakarya.
- [11] Pratama, H. (2025). Inovasi media pembelajaran di wilayah rural: Tantangan dan peluang. Jurnal Kebijakan Pendidikan, 15(1), 10-25.
- [12] Putri, D. (2023). Media Bumi Putar: Visualisasi kognitif untuk astronomi anak. Jurnal Ilmiah PAUD, 13(2), 150-165.
- [13] Ratna, D. (2024). Kesiapan akademik anak usia dini memasuki sekolah dasar. Jurnal Pendidikan Dasar, 16(1), 40-55.
- [14] Rina, S. (2023). Guru sebagai fasilitator dalam membangun nalar kritis anak. Jurnal Guru dan Pembelajaran, 6(2), 100-115.
- [15] Sugiyono. (2022). Metode penelitian kualitatif, kuantitatif, dan R&D. Alfabeta.
- [16] Tono, M. (2024). Dampak kebahagiaan belajar terhadap prestasi akademik di sekolah. Jurnal Psikologi Sosial, 7(2), 110-125.