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Analysis of Teachers' Understanding of Natural Material Media in Learning at Early Childhood Education in Tapaktuan District

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A B S T R A C T

Early Childhood Education plays an important role in supporting children's cognitive, social, emotional, and creative development through meaningful learning experiences. Learning activities at this level require appropriate media that can stimulate children's curiosity and active participation. Natural material media, which utilize objects from the surrounding environment such as leaves, stones, seeds, sand, and shells, offer opportunities for experiential learning that are concrete and contextually relevant to children's daily lives. Limited understanding among teachers regarding the use of natural material media may reduce the effectiveness of such learning resources in classroom practice. This study aims to analyze teachers' understanding of natural material media in learning activities in Early Childhood Education institutions in Tapaktuan District. A qualitative descriptive approach was employed to explore teachers' knowledge, planning ability, and implementation of natural material media in classroom learning. Data were collected through interviews, observations, and documentation involving teachers from several Early Childhood Education institutions. Results indicate that teachers generally recognize the potential of natural materials as learning media and have applied them in simple learning activities that encourage creativity and exploration. Greater pedagogical planning and professional support would further enhance the effective use of natural material media in Early Childhood Education learning environments.

1. Introduction

Early Childhood Education (ECE) represents a fundamental stage in developing children's personality, intelligence, and social abilities. The early years are widely recognized as a critical period for human development because children experience rapid growth in cognitive, social-emotional, language, and physical domains. Educational experiences provided during this period significantly influence the

formation of children's learning attitudes and future academic readiness. Children at an early age naturally learn through play, exploration, and direct interaction with their surroundings. Learning activities in early childhood education should therefore provide concrete and meaningful experiences that correspond to the developmental characteristics of young learners.

Early childhood education is widely regarded as a crucial foundation for optimizing children's developmental potential. Development during this stage occurs rapidly across multiple aspects, including cognitive, social-emotional, physical, and language development (Rizky et al., 2025; Roslan et al., 2022). Effective learning in early childhood education requires the use of appropriate learning media that can stimulate children's development optimally (Sholekah & Khunaifi, 2026). Learning media function as instructional tools that assist teachers in delivering educational content and help children understand concepts more easily (Hartanto et al., 2025; Lubis et al., 2023). Attractive and developmentally appropriate learning media contribute significantly to creating an engaging and enjoyable learning environment for young children (Amaefule et al., 2023).

Learning media play an important role in facilitating meaningful learning experiences for young children. Media enable children to understand concepts concretely, attract their attention, and encourage active engagement during the learning process. (Khairuman et al., 2025; Lubis et al., 2023; Ramadani & Guspatni, 2025) explained that learning media include any tools or materials used to transmit messages, stimulate thoughts and feelings, and encourage learners' participation so that learning can occur effectively. Learning media in early childhood education therefore serve not only as instructional aids for teachers but also as bridges that connect children's concrete experiences with abstract concepts (Agya et al., 2025; Utami & Rohmah, 2025).

Natural materials represent one of the most relevant forms of learning media for early childhood education. Natural material media refer to learning resources derived from the surrounding environment, such as leaves, twigs, stones, sand, seeds, flowers, shells, and other organic materials. The use of natural materials in learning provides several advantages for children's development. Exploration activities using natural materials can enhance creativity and imagination (Handayani et al., 2026). Direct interaction with natural objects also supports children's cognitive development through experiential learning (Kurniasari, 2025). Environmental awareness and appreciation for nature can develop through learning experiences involving natural materials (Yeşilyurt et al., 2020). Availability and affordability of natural materials also make them accessible learning resources for teachers (Mullens & Hoffman, 2023). Learning activities that involve natural materials align with the principles of child-centered learning because children actively explore, manipulate, and experiment with the materials during the learning process.

Several studies have examined the role of learning media in early childhood education. Research on audio-visual media demonstrated positive effects on children's learning engagement and comprehension (Suharsiwi et al., 2022). Other

studies emphasized the effectiveness of educational games in improving children's participation and motivation (Yu et al., 2021). Technological media have also been explored as tools to enhance learning experiences in early childhood classrooms (Vidal-Hall et al., 2020). Additional research highlighted the contribution of learning media to the development of specific competencies such as naturalistic intelligence, language ability, and creativity (Afnan et al., 2025; Kinasih & Widyasari, 2023)

Research on loose parts, which are closely related to natural material media, also shows promising outcomes in early childhood education. (Cankaya et al., 2023) reported that loose parts materials support children's creativity, problem-solving abilities, and naturalistic intelligence through open-ended exploration. Another study emphasized the importance of teacher training in developing learning media from recycled or local materials to enhance creativity and innovation in classroom practices (Abdullah, 2025). Previous research therefore confirms that various forms of learning media contribute significantly to the quality of early childhood education.

Despite the increasing attention to learning media in early childhood education, studies focusing specifically on teachers' understanding of natural material media remain limited. Most previous research emphasized the effectiveness of particular media types or their impact on children's developmental outcomes. Limited research has examined how teachers understand, design, and implement natural materials as learning media in early childhood classrooms. Teachers' understanding plays a crucial role because successful implementation of natural materials depends on teachers' knowledge, creativity, and pedagogical competence.

Preliminary observations conducted in several early childhood education institutions in Tapaktuan District indicate that teachers' understanding of natural material media is still relatively limited. Many teachers tend to rely on commercially produced learning media such as picture cards, plastic blocks, and factory-made teaching aids. Such media are practical and easy to obtain but often fail to stimulate children's creativity and may not reflect the children's immediate environment. Learning activities that rely heavily on manufactured materials may reduce opportunities for children to explore natural resources available in their surroundings.

Tapaktuan District possesses abundant natural resources that have strong potential to be utilized as learning media for early childhood education. The geographical location of Tapaktuan on the southern coast of Aceh provides diverse environmental resources including coastal areas, plantations, and mountainous landscapes. Natural materials such as shells, sand, stones, leaves, seeds, and plant fibers can be integrated into various learning activities. Learning activities that incorporate these materials allow children to explore scientific concepts, develop fine motor skills, and enhance creativity through hands-on experiences.

Integration of natural materials into early childhood learning also aligns with the principles of experiential learning and environmental education. Children who

interact directly with natural materials develop a deeper understanding of their environment and become more aware of ecological values. Educational experiences involving natural materials can foster curiosity, environmental responsibility, and appreciation for nature. Such approaches are consistent with the principles of the Early Childhood Curriculum that emphasize active, creative, effective, and enjoyable learning experiences.

Challenges remain in implementing natural material media in early childhood classrooms. Several factors contribute to this issue, including limited teacher knowledge regarding the design and use of natural materials, lack of innovation in developing local learning resources, insufficient institutional support, and limited ecological awareness among educators (Parry & Metzger, 2023). Difficulties in adapting learning media to children's developmental characteristics and learning objectives have also been reported in previous studies (Yildirim & Surer, 2021). These conditions indicate the importance of examining teachers' understanding of natural material media in early childhood education.

Understanding teachers' perspectives and competencies related to natural material media is essential for improving the quality of early childhood learning. Teachers who understand the pedagogical potential of natural materials can design creative learning activities such as counting with seeds, identifying colors and shapes using leaves and flowers, and creating artistic products from organic materials. Such activities not only strengthen children's cognitive abilities but also support character development, creativity, independence, and environmental awareness. Based on these considerations, this study aims to analyze teachers' understanding of natural material media in early childhood learning in Tapaktuan District. The research specifically examines teachers' knowledge, planning, and implementation of natural material media, as well as the supporting and inhibiting factors influencing their use in early childhood education settings.

2. Methodology

Research Design

This study employed a qualitative descriptive research approach to explore teachers' understanding of the use of natural material media in early childhood education learning activities. The qualitative approach allowed comprehensive exploration of teachers' perceptions, experiences, and instructional practices within authentic classroom contexts. The research emphasized interpretation of social meaning rather than measurement of numerical variables. Classroom conditions remained natural throughout the study process without experimental manipulation. The descriptive design enabled detailed depiction of teachers' knowledge, pedagogical practices, and contextual considerations related to natural material learning media. Data were obtained directly from teachers through interaction and observation within the educational setting. The approach focused on how teachers conceptualize, interpret, and implement learning media derived from natural environmental resources. The qualitative design also supported contextual

understanding of educational practices within the social and environmental conditions of early childhood education institutions in Tapaktuan District.

Research Site and Duration

The research was conducted in Tapaktuan District, South Aceh Regency, Aceh Province, Indonesia. The district is characterized by diverse natural environments including coastal areas, hills, and community plantations that provide abundant natural materials suitable for early childhood learning activities. Natural resources available in the surrounding environment include shells, sand, small stones, leaves, twigs, fruit peels, and seeds that can function as contextual learning media. Two early childhood education institutions served as research locations. The selected institutions were Early Childhood Education Al Kahfi and Early Childhood Education Bungong Jambe. Both institutions actively implement thematic learning activities that utilize environmental resources as learning materials. Early Childhood Education Al Kahfi is located near coastal areas where marine natural resources are accessible for classroom activities. Early Childhood Education Bungong Jambe is located in a plantation area where agricultural materials are commonly available. Data collection was conducted over a three-month period from December 2025 to February 2026. The research process included preparation, field data collection, and analysis stages conducted systematically.

Participants

Research participants consisted of eight early childhood education teachers working in the selected institutions. Participant selection followed purposive sampling principles based on relevance to the research focus and teaching experience in early childhood education. The selection process emphasized information richness rather than statistical representation. Teachers participating in the study possessed direct experience in designing and implementing learning activities involving natural materials. Participant eligibility criteria included minimum two years of teaching experience in early childhood education institutions. Participants also demonstrated familiarity with natural material learning media or had previously applied such media in classroom instruction. Willingness to participate in interviews and classroom observations was required for inclusion in the study. Teachers represented diverse educational backgrounds and professional experiences that enriched the research data. The diversity of teaching experiences contributed to broader perspectives regarding pedagogical practices related to environmental learning media. Table 1 presents the distribution of research participants.

Table 1. Research Participants

Institution	Number of Teachers	Teaching Experience
Early Childhood Education Al Kahfi	4	3–10 years
Early Childhood Education Bungong Jambe	4	2–8 years
Total	8 teachers	—

Instrument

The researcher functioned as the primary research instrument responsible for planning, collecting, analyzing, and interpreting data throughout the research process. Direct interaction between researcher and participants allowed deeper understanding of teachers' perspectives and practices related to natural material media. Supporting instruments were developed to guide systematic data collection procedures. These instruments included interview guidelines, observation sheets, and documentation recording formats. The interview guide contained open-ended questions designed to explore teachers' conceptual understanding, instructional experiences, and reflections regarding natural material learning media. Observation sheets were used to document classroom activities, teacher strategies, and student engagement during learning sessions involving natural materials. Documentation formats facilitated systematic recording of institutional documents and visual evidence related to learning activities. Supporting instruments ensured consistency during the data collection process and improved organization of research records. Table 2 describes the instruments used in this research.

Table 2. Research Instruments

Instrument	Purpose	Data Type
Interview Guide	Exploring teachers' understanding and experience	Verbal narrative data
Observation Sheet	Recording classroom learning activities	Behavioral and contextual descriptions
Documentation Format	Recording institutional documents	Written and visual records

Data Collection

Data collection applied three complementary techniques consisting of interviews, observations, and documentation. Semi-structured interviews were conducted with eight participating teachers to explore their conceptual understanding and professional experiences in utilizing natural materials for early childhood learning. Interview sessions lasted approximately thirty to sixty minutes and were conducted directly in the school environment. Audio recordings and written field notes documented the conversation process to ensure accuracy of information. Classroom observation documented teacher practices during thematic learning activities involving natural materials. Observations focused on types of natural materials used, teacher strategies for introducing learning media, integration of environmental materials within thematic lessons, and student engagement during learning activities. Observation records included descriptive field notes capturing classroom interactions and learning dynamics. Documentation served as supplementary data to strengthen the credibility of research findings. Collected documents included weekly and daily lesson plans, photographs of learning activities, student work produced using natural materials, and institutional program records related to environment-based learning.

Data Analysis

Data analysis followed an interactive qualitative analysis model consisting of data reduction, data display, and conclusion drawing. The analysis process occurred continuously throughout data collection and interpretation stages. Data reduction involved selecting relevant information from interview transcripts, observation notes, and documentation materials. Collected data were categorized according to thematic aspects related to teachers' understanding of natural material learning media. Coding procedures were applied to identify patterns and recurring themes across multiple data sources. Data display involved organizing reduced data into structured narrative descriptions and thematic matrices that facilitated interpretation of relationships among categories. Structured presentation enabled identification of similarities and differences in teachers' instructional practices across research locations. Conclusion drawing represented the final stage of the analytical process. Interpretations were developed through continuous comparison of findings from interviews, observations, and documents. Triangulation techniques strengthened research credibility by comparing multiple data sources and collection methods. The analytical process generated comprehensive interpretation of teachers' understanding and implementation of natural material learning media within early childhood education contexts in Tapaktuan District.

3. Results and Discussion

The findings of this study describe teachers' knowledge, design ability, and classroom implementation of natural material media in Early Childhood Education institutions in Tapaktuan District. Data were obtained through interviews, observations, and documentation involving teachers from several Early Childhood Education centers. Analysis focuses on how teachers understand natural material media, how they design learning activities using these materials, and how the media are implemented during classroom learning. Evidence from interviews, classroom observations, and institutional documents consistently supports each major finding, indicating that teachers' understanding and practices were verified through triangulation of multiple data sources. This triangulation strengthens the credibility of the results and reflects the actual learning conditions in the classroom.

Teachers generally demonstrate a practical understanding of natural material media. Natural materials are commonly defined as objects obtained from the surrounding environment and used as learning tools for children. Teachers recognize that these materials differ from manufactured learning media because they originate directly from nature and are easily found in the local environment. One teacher explained, "*Natural materials are things that we can collect from the environment, such as leaves, stones, sand, or seeds, which can be used by children to play and learn."* Similar explanations appeared in observation records showing teachers introducing environmental objects during learning activities and in lesson plans documenting the use of such materials. These converging data indicate that teachers possess experiential knowledge derived primarily from classroom practice rather than formal theoretical training. Practical experience becomes the main source of

understanding, influencing how teachers select and utilize natural materials in learning activities.

Understanding of the function of natural material media is closely related to teachers' perceptions of children's learning characteristics in Early Childhood Education. Teachers believe that natural materials support children's creativity and provide opportunities for hands-on exploration. Classroom observations reveal that children show higher engagement when interacting with materials that have different textures, shapes, and colors. One teacher stated, "*Children are more interested when they can touch and arrange the materials themselves. They become more active and enjoy the activity."* Documentation in the form of photographs of learning activities confirms children's active participation during such tasks. These findings explain why natural materials are frequently used as learning tools, especially in activities related to art, sensory play, and simple construction tasks. Direct interaction with real objects provides concrete learning experiences that align with the developmental characteristics of young children.

Designing learning media using natural materials remains relatively simple and situational. Teachers generally do not follow a systematic instructional design process when preparing the materials. Media preparation usually occurs shortly before the learning activity and is adjusted to the theme of the lesson. Teachers collect leaves, seeds, or small branches from the surrounding environment and use them for activities such as collage making, sorting, or pattern arrangement. One teacher described the process as follows: "*Usually I collect materials from around the school or bring them from home, then I decide how children will use them in the activity*." Observation data show similar preparation practices, while lesson plans document the selected materials without detailed design procedures. These converging sources suggest that creativity in designing learning media emerges primarily from practical classroom needs rather than structured pedagogical planning.

Limited design planning influences the level of variation in learning activities. Most activities involve arranging, pasting, or grouping materials according to certain patterns. Such activities are effective for developing fine motor skills and creativity, yet the potential of natural materials as open-ended learning resources is not always fully explored. Open-ended materials ideally allow children to investigate, experiment, and construct ideas independently. More systematic pedagogical planning would enable teachers to transform simple natural objects into richer exploratory learning experiences that stimulate problem solving and higher-order thinking skills.

Implementation of natural material media in Early Childhood Education classrooms generally follows a demonstration–exploration pattern. Teachers begin the activity by introducing the materials and explaining the task, after which children manipulate the materials independently or in small groups. Classroom observations indicate that this approach encourages active participation. One teacher noted, "*After I show them how to use the materials, children usually create their own ideas and sometimes use them in different ways."* Photographic documentation and field

notes confirm that children often modify the materials creatively during the activity. Natural materials therefore function as flexible learning resources that allow children to express imagination and develop autonomy in learning.

Interaction between teachers and children plays an important role in maximizing the benefits of natural material media. Teachers guide children through simple instructions and provide assistance when difficulties arise. Effective facilitation helps children maintain focus while preserving opportunities for independent exploration. Active supervision also ensures safety during the use of natural objects. One teacher emphasized this aspect by stating, "*We must supervise children closely so they can explore the materials safely*." Observation data corroborate this statement, showing teachers continuously monitoring children's activities.

The pedagogical value of natural materials extends beyond supporting creativity and exploration. Real objects connect learning with children's everyday environment, providing sensory experiences that strengthen cognitive, emotional, and social development. Interaction with environmental materials also promotes ecological awareness because children become familiar with natural objects in their surroundings. Learning activities involving natural materials reflect principles of experiential learning in which knowledge is constructed through direct experience. Opportunities to manipulate, compare, classify, and transform materials can foster early scientific thinking, problem solving, and decision-making skills. Engagement with environmental resources also supports the development of responsibility toward nature from an early age.

Findings of this study indicate that teachers recognize many of these benefits, yet classroom implementation still relies heavily on spontaneous creativity and practical experience. Systematic instructional design and professional development support are required to maximize the educational potential of natural materials. Structured training could help teachers design activities that integrate creativity, cognitive development, environmental education, and experiential learning into a coherent pedagogical framework. Strengthening teachers' competence in this area would enhance the contribution of natural material media to holistic development in Early Childhood Education. To ensure the validity of the findings, data were triangulated across three sources: interviews, classroom observations, and institutional documentation. This triangulation was used to examine the consistency between teachers' stated knowledge, their actual classroom practices, and the formal planning recorded in lesson plans. The results of this cross-source analysis are presented in Table 3.

Table 3. Research Data Triangulation

No	Research Focus / Indicator	Interview Data	Observation Data	Documentation Data
1	Teachers' knowledge of the concept of natural material media	Teachers explain that natural material media refers to materials from the surrounding environment such as	Teachers introduce natural materials to children during	Daily Lesson Plans and Weekly Lesson Plans that include the use of natural materials as learning media

		leaves, stones, seeds, and twigs	learning activities	
2	Teachers' understanding of the function of natural material media	Teachers state that natural material media makes learning more interesting, cost-effective, and helps children become familiar with the environment	Teachers use natural materials for activities such as collage making, arranging stones, or leaf stamping	Photographs of learning activities using natural materials
3	Teachers' ability to design natural material media	Teachers explain the process of designing media in a simple way based on available materials	Teachers prepare natural materials such as leaves, stones, or seeds before the learning process	Learning activity plans showing the media used in the lesson
4	Teachers' ability to create natural material media	Teachers mention examples of media such as seed collages, models made from twigs, or leaf stamping	Teachers create or prepare simple media made from natural materials	Documentation of children's artworks created from natural materials
5	Teachers' ability to implement natural material media in learning	Teachers explain the steps for using the media, beginning with demonstration followed by children's creative activities	Teachers demonstrate how to use natural materials and then allow children to explore them	Photographs of children's learning activities using natural material media
6	Children's involvement in activities using natural materials	Teachers state that children enjoy collecting natural materials and creating artworks	Children actively collect stones, leaves, or seeds in the school yard	Documentation of natural material exploration activities
7	Children's response to natural material media	Teachers report that children show enthusiasm when using natural material media for the first time	Children appear interested and actively engaged during activities using natural materials	Photographs of children's learning activities
8	Supporting factors for the use of natural material media	Teachers mention the surrounding environment, which is rich in natural materials, as a supporting factor	Teachers utilize the school yard and surrounding environment	School program documents related to environment-based learning
9	Inhibiting factors in the use of natural material media	Teachers mention limited creativity, lack of training, and limited ideas as obstacles	Teachers occasionally return to using factory-made learning media	No documentation of specific training related to the use of natural materials

4. Conclusion

This study examined teachers' knowledge, design ability, and classroom implementation of natural material media in Early Childhood Education institutions in Tapaktuan District. Findings indicate that teachers possess a practical understanding of natural material media mainly derived from classroom experience and daily interaction with the surrounding environment. Natural materials are recognized as accessible learning resources that support children's curiosity, creativity, and active participation during learning activities. Direct interaction with real objects also provides concrete sensory experiences that are consistent with the developmental characteristics of children in Early Childhood Education.

Results also show that teachers are able to design and apply natural material media in classroom learning, although the design process remains relatively simple and often emerges from situational classroom needs. Learning activities commonly involve arranging, grouping, or pasting natural materials, which contribute to the development of children's creativity and fine motor skills. Classroom implementation generally follows a demonstration and exploration pattern that allows children to manipulate materials and express their ideas through play-based learning. Implementation of natural material media demonstrates positive potential in creating engaging and meaningful learning experiences for children. Improvement in pedagogical planning would further strengthen the effectiveness of this approach. Professional development programs focusing on instructional design and creative learning media development may help teachers optimize the educational value of natural materials. Future research may explore more innovative strategies for integrating natural materials into structured learning models and examine their broader contribution to children's cognitive, social, and environmental awareness development in Early Childhood Education contexts.

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