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The Role of Natural Leadership in Early Childhood: Disaster Education and Tree Planting Through The Ecokids Program at Anugerah Sumedang Kindergarten

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Abstract

Purpose: This community service activity aims to describe the qualitative change in kindergarten-age children's understanding of disaster issues and identify indicators of natural leadership defined as leadership-related behavior that emerges spontaneously in early childhood through direct experience that appeared in early childhood through disaster education and tree planting activities at Anugerah North Sumedang Kindergarten.

Methods: Activities were implemented using an experiential learning approach. Data were collected through participatory observation, informal interviews with the school principal, and activity documentation, and were then analysed descriptively by comparing children's baseline exposure to disaster material with their responses during and after the activity; no formal pre- and post-test instrument was administered.

Practical Application: Cardboard puppet media was observed to help kindergarten children engage with disaster-related material, while the tree planting activity appeared to encourage indicators of natural leadership such as initiative, collaboration, and a sense of responsibility toward the environment.

Conclusion: Based on observations, interviews, and documentation data, kindergarten children showed observable positive changes in disaster-related understanding relative to their reportedly limited prior exposure, together with behavioural indicators of natural leadership, including willingness to take risks, small group collaboration, and a sense of ownership toward the trees they planted. As these findings rest on qualitative, single-site, short-term data rather than a formal assessment, they should be read as indicative rather than generalisable evidence.

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Introduction

Indonesia is a country with a high level of disaster vulnerability. The National Disaster Management Agency (BNPB) recorded more than 5,400 disaster events in 2023, with significant casualties and material losses (Kalinichenko et al., 2022). However, public awareness and preparedness for disasters, especially among the younger generation, remain relatively low (Hesti et al., 2025). Environmental damage caused by deforestation and land conversion also exacerbates disaster risk.

Early childhood is the most vulnerable group to the impact of disasters, but at the same time, it is the next generation that needs to be formed in awareness from an early age. According to Law Number 20 of 2003 concerning the National Education System, early childhood education (PAUD) is a coaching effort aimed at children from birth to the age of six to help physical and spiritual growth and development so that they are ready to enter further education (Farhana & Musrikah, 2026). Disaster education in kindergarten is an important foundation for building a long-term disaster awareness culture (Humaedi et al., 2025a).

Thus far, early childhood has often been positioned as a passive object in disaster and environmental education programs, whereas contemporary leadership studies suggest that leadership-related behaviour can begin to emerge from a very young age through direct experience, not just through one-way instruction from adults. (Imara et al., 2025) argues that genuine leaders are formed through lived experience in facing real challenges rather than theoretical exposure alone, a principle that is plausibly relevant to young children when they are placed in authentic situations, such as answering questions in front of their peers or jointly deciding how to plant tree seedlings in their groups. (Kusdinar, 2025) further describes leadership as the capacity to influence the thoughts, emotions, and behaviours of others toward a shared goal, characterised by traits such as collaboration, courage to take risks, participation, and the ability to inspire. Although Kusdinar framework was developed for an organizational context, this activity adopts these characteristics as an operational reference for what is termed consistently throughout this article as natural leadership: behavioural indicators of leadership that emerge spontaneously in early childhood through direct interaction with disaster issues and the surrounding environment without explicit instruction from adults. This single term is used in place of the various labels employed loosely

in earlier community service discussions of similar activities, such as “insightful”, “green”, or “environmentally friendly” leadership.

However, most existing disaster education and environmental community service programs for early childhood remain oriented toward the one-way transmission of knowledge from the facilitator to the child, with limited documentation of how leadership-related behaviour emerges from children’s own initiative during the activity itself. Few community service reports explicitly connect disaster education media with subsequent pro-environmental actions, such as tree planting, as a single, continuous learning sequence or describe the specific indicators used to recognise natural leadership in young children. This gap in the documentation linking disaster education to child-initiated environmental action as a pathway for natural leadership is what the EcoKids activity seeks to address, and it constitutes this article’s specific contribution to the practice-based literature on early childhood disaster education and leadership development.

Departing from this thought, the EcoKids team designed and implemented a service activity entitled "EcoKids: Learning Disasters, Planting Hope" as a real effort to foster disaster awareness as well as natural leadership in early childhood. This activity combines disaster education based on creative media in the form of cardboard puppets with tree-planting actions, involving 28 kindergarten children of Anugerah Sumedang Utara as the target and the main subject of learning. The main objectives of this activity are as follows: (1) to describe the change in kindergarten children's understanding of disaster issues before and after participating in educational activities; (2) to identify forms of insightful leadership behaviours that appear in early childhood during educational and tree planting activities; and (3) to analyse tree planting activities as the peak of growing natural leadership in early childhood.

Method

The EcoKids activity was held on 22 May 2026 at Anugerah Sumedang Utara Kindergarten, Sumedang Regency, involving 28 kindergarten children aged 4–6 years as the main subjects. The activity used an experiential learning approach (Schmidtke et al., 2025), which includes cycles of concrete experience, reflection, abstract conceptualisation, and active experimentation. As a baseline for comparison, the team also gathered information through the interview described below on the extent to which disaster-related material had previously been introduced to the children prior to the educational activity (Wijnen-Meijer et al., 2022).

Data were collected using three main techniques. First, participatory observation was conducted throughout each session, focusing on three aspects: children's verbal responses to disaster-related questions, their behavioural engagement during the cardboard puppet storytelling, and their role-taking and expressions of ownership during the tree-planting activity. Second, an informal, semi structured interview was conducted with Mrs. Sena, S.Pd., the Principal of Anugerah Kindergarten, after the activity, covering three topics: the school's existing exposure to disaster material prior to EcoKids, her assessment of the children's engagement and understanding during the sessions, and any behavioral changes she observed compared with the children's everyday classroom conduct. Third, photo and video documentation were collected as supporting evidence and material for team evaluation.

Two sets of descriptive indicators guided the data collection and interpretation. Understanding of disaster issues was inferred from children's ability to respond appropriately to disaster-related questions during the Q&A session, compared to their reported baseline exposure. Natural leadership was inferred from behavioural indicators adapted from (Kusdinar, 2025) leadership characteristic collaboration, courage to take risks, initiative, the ability to inspire peers, and adaptability as they appeared in children's spontaneous actions, and are summarised later in Table 2. The observation notes, interview transcripts, and documentation were then organised descriptively qualitatively around these indicators; no statistical or formal pre- and post-test analysis was applied, and the resulting account should be read as a qualitative, activity-based description rather than a measured evaluation of learning outcomes.

According to the school, Before the EcoKids activity took place, the PAUD curriculum at Anugerah Kindergarten had not explicitly included disaster education materials, so children's exposure to this topic was still very limited. The EcoKids activity was held on 22 May 2026 at Kindergarten Anugerah Sumedang Utara and was attended by 28 children aged 4–6 years. Based on the team's observations, the activities were conducted interactively, warmly, and enjoyably, and the children's engagement appeared to change noticeably from session to session. The following section describes these observations stage by stage, distinguishing between what the team directly observed, what the school reported, and the team's interpretation of these observations.

Opening and Ice Breaking Session

The activity was opened with the introduction of the facilitator team which

was carried out in a light and interesting manner, followed by ice breaking in the form of singing together. This session succeeded in diluting the atmosphere, building the children's trust in the older facilitators, and conditioning their attention before entering the core sessions.



Figure 1. Opening and Ice Breaking Session

Educational Session Using Cardboard Puppets

Educational materials about natural disasters, especially floods and landslides, were delivered through cardboard puppets decorated with colourful animated illustrations. Members of the facilitator team took turns operating the puppets and voicing the story's characters in simple, light, and expressive language. The team observed that the children appeared to be engaged with the storyline, and some spontaneously exclaimed in response to certain scenes. The team interpreted this as a sign that the material had captured the children's attention and emotional engagement, although this interpretation was not independently verified through formal comprehension checks. According to the school, a number of children who were usually shy responded to the story as soon as the puppets began to "speak", which the principal described as an early sign of a shift from passive to more active participation.



Figure 2. Educational Session Using Cardboard Puppets

Interactive Q&A Session

The team asked light questions about the material that had just been presented. Children who came forward to answer were given prizes in the form of snacks. This session drew the most active participation, as many children came forward eagerly, including some who had initially seemed shy. According to the school, the children who are usually difficult to condition when visited by formal guests from outside, are enthusiastic and able to engage when visited by unfamiliar adult guests. They were noticeably enthusiastic and gave largely appropriate answers, which the principal described as a clear shift from passive to active participation. The team interprets this pattern as an indication of growing understanding, although it is based on observed engagement and the principal's assessment rather than a formal test of comprehension. The willingness of some children to come forward first also appeared to encourage others to try, a simple observation of the ability to inspire peers that (Kusdinar, 2025) identified as one of the core characteristics of leadership.



Figure 3. Interactive Q&A Session

Tree Planting Session Together

The highlight of the activity was the planting of six tree seedlings on the grounds of Anugerah Kindergarten. The children were divided into small groups of two to three, each accompanied by a facilitator. Within each group, the team observed a division of roles that appeared to emerge naturally among the children themselves: some took the initiative to dig a hole first, some took over the task of watering, and some gave brief directions to their friends on how to hold the seedlings correctly. This was a form of participatory leadership on a micro-scale, as directly observed by the team. The most notable response came from several children who did not want to leave the tree they had just planted and asked for it to be named, even stating that they wanted to take care of it daily. The team interprets this spontaneous response as an indication that the children were voluntarily taking responsibility for their own "small projects", rather than simply following adult instructions, though this remains the team's interpretation of an observed behaviour rather than a verified psychological state.



Figure 4. Tree Planting Session Together

EcoKids Activity Output

This activity produced five main outputs: (1) the delivery of disaster education materials that, based on the team's observation and the children's responses in the Q&A session, appeared to be understood by the kindergarten children more than their reported baseline exposure; (2) the planting of six tree seedlings that were voluntarily "adopted" by children as an observed form of personal environmental responsibility; (3) the emergence of natural leadership behaviours in early childhood, including courage to take risks, collaboration in small groups, and the ability to inspire peers, as identified through observation and

interview; (4) the establishment of a working partnership between the implementation team, the school, and the children of Anugerah Kindergarten; and (5) the availability of reusable cardboard puppet (wayang kardus) educational media for similar activities in the future.

Table 2. Characteristics of Environmentally Intelligent Leadership in Early Childhood in EcoKids Activities

Characteristics (Kusdinar, 2025)	**Observation in Anugerah Kindergarten Children**
Collaboration	The children work together in small groups to dig holes, plant, and water the seedlings.
Courage to take risks	Children voluntarily come forward to answer questions despite the risk of getting the answers wrong.
Inspiring ability	The child who dared to appear first triggered the enthusiasm of his friends, who were originally shy to participate.
Adaptation	Children adjust quickly when their attention is distracted during an educational session.
Participation	Children are actively involved, not passive spectators, in all educational and tree planting sessions.

Source: Adapted from Kusdinar (2025)

Discussion

1. Foundations of Environmentally Friendly Leadership: Children's Courage and Collaboration in Disaster Education Activities

   Observations during the activity showed that leadership behaviour not only came from the facilitator team but also grew naturally among the children themselves. In small groups of tree planting, a number of children seem to take the initiative to divide the tasks of digging, planting, and watering without being explicitly directed by adults. This pattern is in line with the principles of participatory leadership put forward by (Wallis & Noble, 2022), who states that the active involvement of each member in the process of co-working can increase the sense of ownership and quality of the group's work, although in this context, it occurs at the scale of early childhood interactions rather than formal organisations. (Wallis & Noble, 2022) It also describes this leadership pattern as

democratic-participatory leadership, in which no one party dominates, but rather responsibilities are shared collectively, a pattern that is reflected in the way children complement each other's roles in their small groups. Because all of these interactions take place in the context of disaster and environmental education, this pattern of participatory leadership that grows among children becomes the initial foundation for more holistic leadership, which becomes evident in the tree-planting sessions.

(Kusdinar, 2025) It summarises several leadership characteristics considered universal: collaboration, agility, openness, courage to take risks, participation, networking, flexibility, and the ability to inspire and adapt. In the context of EcoKids, which is oriented towards disaster and environmental issues, these characteristics do not stand alone but become elements that, taken together, form the natural leadership observed in early childhood. When children's attention began to wander during an educational session, they were observed to re-engage once the delivery approach became more interactive. This behaviour may be interpreted as an indication of adaptability, a characteristic associated with leadership in ever-changing situations (Saguil, 2021). Similarly, the willingness of children to come forward to answer questions despite the risk of being wrong reflects the characteristics of measured risk-taking described by Kusdinar (2025), who argues that it can, in principle, apply to anyone who takes a first step under uncertainty, including five- or six-year-olds. This combination of courage, collaboration, and adaptability, as observed across sessions, appears to gradually shape children's readiness to take on a more tangible leadership role when engaging directly with nature, as seen in the tree-planting session.

2. The Effectiveness of Creative Media in Fostering Children's Concern for Nature

The school gave a very positive assessment of the use of cardboard puppet media, noting that it captured the attention of children who are usually shy or reserved around outside guests. In the team's observation, children were able to give largely correct answers in the question-and-answer session,which the team interprets as a sign of understanding beyond emotional participation alone, an interpretation consistent with the school's report that this contrasted with the children's usual response when disaster material had not previously been introduced in daily learning. hese observations are consistent with prior findings that creative media such as puppetry can enhance kindergarten children's engagement and understanding. (Karaolis, 2023) explains that puppetry creates

interactive, imaginative, and meaningful learning experiences that encourage young children to participate actively in the learning process. Similarly, (Suri et al., 2026) found that creative puppetry based on local stories significantly improved children's narrative comprehension, indicating that puppet-based media can support understanding more effectively than passive, lecture-based delivery..

At a broader theoretical level, the effectiveness of wayang kardus (cardboard puppet) media is consistent with Davis's (2009) principles of environmental education for early childhood, which suggest that children who gain hands-on experience through experiential learning approaches are more likely to develop environmentally conscious attitudes. In this activity, cardboard puppets appeared to function as a bridge between the abstract concept of disasters and kindergarten children's concrete world, allowing environmental values to be absorbed naturally through narratives and experiences. This is consistent with (Mahamid, 2024), who found that cardboard puppet media can foster children's imagination and environmental preservation awareness, and with (Najib et al., 2023), who reported that wayang-based narratives can effectively introduce environmental care to early childhood learners.

3. Tree Planting as the Peak of Environmentally Sound Leadership in Early Childhood

The interview data revealed a phenomenon that was theoretically very significant: the spontaneous response of children who did not want to leave the tree they had just planted and asked for it to be named. The Principal interprets this as the formation of a "sense of belonging" and an "important foundation for the formation of a character of caring for the environment" an interpretation that, from the team's perspective, lends indirect support to the appropriateness of the experiential learning approach used in the design of activities.

From a natural leadership perspective, these children's responses represent the simplest form of what (Robertson & Barling, 2013) describe as pro-environmental behaviour emerging from internalised environmental passion and social norms, rather than from mere verbal instructions. This interpretation is supported by (Marchetti et al., 2025), who found that children's and adults' pro-environmental behaviour is strengthened by a felt connection to nature, and by (Kelly et al., 2023), who reported that biospheric values and a sense of belonging to nature are positively associated with children's environmental actions Unlike

environmental activities that are typically led entirely by adults, in this activity, it is the children who take over the leadership of their own "small projects" They are the ones who decide to name the tree, and they are the ones who declare that they want to take care of it every day. As summarised (Kusdinar, 2025), the essence of leadership ultimately lies in the ability to create meaningful and sustainable change; on the simplest scale, that essence is also reflected in a kindergarten's decision to voluntarily take responsibility for the trees he planted himself. This process also reflects the experiential learning cycle (Kolb, 1984), concrete experience through planting, reflection through question-and-answer activities, conceptualisation through understanding the benefits of trees, and active experimentation through commitment to caring for trees. (Kolb & Kolb, 2009) explain that learning occurs when individuals actively transform their concrete experiences into knowledge and apply it through further action. Similarly, (Kong, 2021) emphasises that experiential learning increases students' motivation and engagement because learners are directly involved in meaningful, real-life experiences. In this activity, children were therefore active learners rather than passive recipients, as they participated in planting, reflected on their experiences, and connected these experiences to their understanding of environmental issues. This finding is consistent with (Apriliana et al., 2022), who applied experiential learning to climate change education and found that direct engagement with environmental issues helps learners develop deeper awareness and responsibility. Thus, this moment represents the culmination of insightful leadership built from disaster education sessions to tree-planting actions, in which children not only understood environmental issues cognitively but also lived them through real actions and took on responsibility..

Taken together, these three discussion points highlight the specific contributions of this activity to the practice-based literature on early childhood disaster education, experiential learning, and leadership development. First, the activity provides a documented, activity-level account of how participatory and non-instructional leadership behaviours can emerge among kindergarten-age children during disaster education activities. This finding complements organisational leadership frameworks such as those proposed by Kusdinar (2025) and Yukl (2013) by offering contextual evidence from an early childhood setting, in which leadership is expressed through everyday peer interactions rather than formal authority (Halpern et al., 2021).

Second, the activity illustrates the operation of Kolb's (1984) experiential

learning cycle within a single, short community-service activity. The children's cognitive engagement during disaster education is connected to behavioural commitment through tree planting, demonstrating that disaster awareness and environmental action can be integrated as one meaningful learning experience rather than treated as separate programme components (Humaedi et al., 2025b).

Third, by describing specific and observable indicators—including the courage to take risks, spontaneous collaboration, the ability to inspire peers, and expressions of ownership toward the planted tree—this activity offers a practical illustration of what natural leadership may look like in early childhood disaster and environmental education. These indicators provide a working description that future early childhood programmes and studies may adapt, test, or refine, particularly in efforts to foster children's participation, environmental responsibility, and leadership from an early age (Bravo et al., 2024).

Conclusion

Based on the implementation of EcoKids activities, Learning from Disasters and Planting Hope, three main conclusions can be drawn from the observation, interview, and documentation data collected. First, kindergarten-age children's understanding of disaster issues increased significantly from the initial condition of minimal exposure to disaster material to a fairly substantive understanding after participating in visual and participatory media-based educational sessions. The use of cardboard puppets has been proven to maintain children's focus while conveying the message of disaster emotionally and substantively, without causing excessive fear.

Second, early childhood has been proven to be able to display the foundation of natural insight leadership since the disaster education session took place, ranging from the courage to take risks when answering questions, natural collaboration in the division of tasks in small groups of tree planting, and the ability to inspire peers who were originally shy to participate. These characteristics are in line with the principles of universal leadership as summarised (Kusdinar, 2025), which shows that insightful leadership can inherently grow in anyone, including five- or six-year-olds, when given the space to experience firsthand the issues of disasters and the surrounding environment.

Third, tree-planting activities are the peak of natural leadership in early childhood. The spontaneous response of children who refuse to leave the tree they have just planted, ask for the tree to be named, and declare that they want to take

care of it every day is the strongest indicator that children are not just passive participants in environmental action, but take responsibility for their own environmentally conscious actions from an early age.

Several recommendations can be submitted: PAUD/kindergarten units need to integrate disaster education into existing learning themes while providing space for children to take an active role not only as recipients of information in environmental activities in schools; higher education institutions and environmentalist communities are advised to build long-term partnerships with PAUD/kindergarten units so that programs like EcoKids can be sustainable and do not stop at one activity; and the need to build a community partner data bank to ensure the sustainability of the program to grow natural insights in early childhood across regions.

These conclusions should be interpreted in light of several limitations. The activity was implemented at a single kindergarten with 28 children on one occasion; therefore, the findings cannot be generalised to other early childhood settings without further study. Data collection relied on participatory observation, one informal interview with the school principal, and documentation, rather than a validated instrument or a formal pre- and post-test design; thus, the reported changes in understanding and the identified indicators of natural leadership reflect the team's qualitative interpretation of short-term behaviour rather than measured or sustained learning outcomes. Future activities and studies would benefit from a more systematic assessment design, a longer observation period, and comparisons across multiple sites to test whether the patterns described here hold more broadly.

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