Educators perceptions of implementing environment-based character education: Evidence from Landak Region

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Abstract

Global crises, particularly the climate crises, highlight the urgent need for educational approaches that cultivate environmental responsibility. The aim of this study is to explore how educators in Landak Region, West Kalimantan, perceive the importance, adequacy, barriers, and success factors of Environment-Based Character Education (EBCE). A questionnaire-based survey was conducted, combining closed and open-ended items, and data were analyzed through descriptive statistics, thematic coding, t tests, chi-square tests, and Spearman correlations. The results show that concern about the climate crises is consistently high across demographic groups, yet EBCE integration into school practice remains fragmented and limited. Barriers include insufficient teacher training, lack of resources, and weak institutional support, while success factors include project-based learning, digital tools, cross-subject integration, and community collaboration. The findings imply that EBCE holds considerable potential for strengthening sustainable education if supported by coherent policies, institutional commitment, and investment in teacher capacity. The study improves existing knowledge by linking local cultural strengths with national frameworks and by offering evidence-based insights for more effective EBCE implementation.

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1. Introduction

Environmental issues have become deepened by unsustainable lifestyles (Orchard & Reiss, 2025; Wantu & Lakadjo, 2025; Zahrah & Rahmat, 2022). These challenges are rooted in values and everyday practices. Without shifts in individual and collective responsibility, even ambitious strategies risk remaining ineffective. Indonesia illustrates this urgency particularly well. As one of the world's most diverse countries with more than 300 ethnic groups and over 700 languages, and occupying third largest tropical forest area, the country is both ecologically rich and environmentally vulnerable at the same time (FWI/GFW, 2002). Landak Region in West Kalimantan demonstrates the connection of ecological vulnerability and cultural significance, as Dayaknese communities rely strongly on forest ecosystems for their identity and livelihoods (Ratriyana, 2023). Such conditions make education centered transformations a critical pathway to support both conservation and cultural continuity (Jordan et al., 2023; Prayogo et al., 2024).

Against this backdrop, Environment based Character Education (EBCE) has emerged as an educational approach that fosters and transforms responsibility toward nature and supports sustainable habits (Supriyadi, S., Kania, N., & Hermawan, A., 2023), preparing young people to respond to climate crises in meaningful ways (Cayha & Meliyani, 2025; Asri & Deviv, 2023; Husen et al., 2022; Jordan et al., 2023).

EBCE is designed to equip students with environmental knowledge, attitudes, values and practical skills to act sustainably (Deviv, 2024; Parhan & Dwiputra, 2023) and is the moral foundation for the future-oriented use of technical skills (Cayha & Meliyani, 2025). Educators play an important role as mediators of these knowledges and skills (Cayha & Meliyani, 2025; Parhan & Dwiputra, 2023; Rahayu & Dong, 2022). Practices such as waste management, tree planting, reducing energy use and lowering emissions are intended to internalize environmental responsibility at the individual level which, once multiplied across schools and communities, can support wider societal change (Wantu & Lakadjo, 2025; Zainuddin & Agus, 2025). Beyond knowledges and skills, EBCE fosters critical reflection and transformative learning, helping students understand the long-term implications of their actions and reducing environmental anxiety by translating awareness into concrete practices (Asri & Deviv, 2023; Jordan et al., 2023; Mawaddah et al., 2025; Yusuf & Fajari, 2025). This dual focus on cognitive and behavioral development makes EBCE a promising response to climate crises. Its necessity lies

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in its capacity to close the well documented gap between environmental knowledge and actual behavior, to translate awareness into action and to build long term cultural and institutional foundations for sustainability (Asri & Deviv, 2023; Jordan et al., 2023). In practice, EBCE's core is to foster strong connection and responsibility toward environment (Matitaputty et al., 2022).

Research highlights both barriers and success factors that shape the extent to which EBCE can fulfill this promise. Barriers include rigid curricula that restrict innovation, insufficient teacher training that limits professional capacity, lack of adequate resources, weak governmental support and at times low levels of student engagement (Asri & Deviv, 2023; Wantu & Lakadjo, 2025). These barriers show that educators intrinsic motivation is not sufficient without the regulation and institutional support. Success factors include project based learning (Nurkhin et al., 2025; Rahayu & Dong, 2022; Wahyuni et al., 2024), cross subject integration (Japar et al., 2024; Zahrah & Rahmat, 2022), digital literacy (Sitanggang, Lubis, Muljono, & Pramono, 2025), and local wisdom (Japar et al., 2024; Marsakha et al., 2021; Nurkhin et al., 2025; Parhan & Dwiputra, 2023; Sitanggang et al., 2025). This aligns with evidence that environmental education programs such as Adiwiyata can reinforce responsibility, empathy, and collaboration by embedding EBCE values in school culture (Nada et al., 2021). Such approaches can enhance student engagement and foster collaboration between schools and wider society. They point to concrete strategies that can strengthen implementation even in resource constrained environments.

Indonesia has formally recognized the importance of EBCE. In 2005 a memorandum between the Ministries of Environment and Education led to the launch of EBCE in 2006 as a government initiative to strengthen schools as spaces of environmental awareness. The Adiwiyata program promotes the integration of ecological and cultural values into school practices (Prayogo et al., 2024; Setyowati & Aji, 2015). Indonesia's Environmental Law defines the environment broadly within ecological and social terms. It emphasizes the link between environmental knowledge, social well-being and moral development (Asri & Deviv, 2023; Maryani, 2016; Nuraeni & Idawati, 2020). Yet the extent to which these frameworks are translated into daily school practices remains uncertain, particularly in rural and culturally diverse contexts such as Landak Region.

Despite strong policy frameworks, little empirical research has examined how EBCE is perceived by those directly responsible for its implementation. In particular, there is still little research examining educators perceptions of EBCE, especially in a local cultural context. Therefore, this study aims to address this gap by exploring educators perceptions in Landak Region. Specifically, it asks the following research questions:

a. How do educational stakeholders in Landak perceive the importance and adequacy of EBCE within their schools and communities

b. What barriers and success factors do they identify for implementing EBCE in practice

c. How do these perceptions reflect both local cultural contexts and broader national policy frameworks

2. Method

The study employed a questionnaire based survey (Appendix 1) to explore the perceptions of educational stakeholders in the Landak Region regarding the implementation of EBCE. An overview of the methodological procedure is presented in Figure 1, which summarizes the main steps of the study.

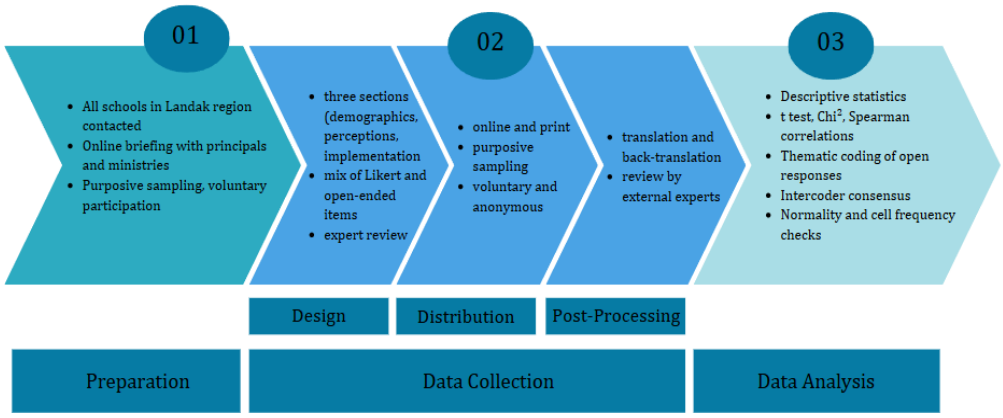

Figure 1. Methodology

Prior to distribution, all schools in the region were contacted and school principals as well as representatives of the relevant ministries were invited to an online meeting. During this meeting the project was introduced and discussed and questions could be raised. Emphasis was placed on local relevance and international attention, as the international author team was introduced and the added value of linking local perspectives with global interest was underlined. After this the Questionnaire was sent to all schools in Landak Region. Therefore, sampling was purposive as all schools and relevant stakeholders in Landak were approached, while actual participation followed a convenience logic due to its voluntary nature.

2.1. Data Collection

The instrument was developed with reference to insights from the literature and motivated by ongoing debates while remaining intentionally open to the perspectives of respondents. In this way, the questionnaire avoided the risk of confirmation bias and sought to capture not only predefined issues but also newly emerging challenges and potentials. The questionnaire was structured into three parts. The first part collected demographic information of participants such as professional history and cultural identity through closed items without any predefined scale. No detailed scale definition was required because these items captured factual background information rather than perceptions and opinions. The second part examined perceptions of climate crises and integration of environmental topics in education through a mix of closed questions on a five point Likert scale ranging from strongly disagree to strongly agree as well as open ended items that allowed for either free responses or multiple selections. The third part addressed implementation mechanisms and consisted entirely of open ended items.

To ensure accessibility, the questionnaire was collaboratively developed in English by the author team and reviewed for content coherence by one external expert from each institution represented by the authors before being translated into Bahasa Indonesia. This multilingual approach was chosen to account for local linguistic diversity and to support epistemically just research (Chigevenga, 2022). All versions were back translated and reviewed by an external researcher to ensure consistency.

All questionnaires were distributed both electronically and in printed form to account for limited internet access in parts of the region. Participation was entirely voluntary and all responses were anonymous.

2.2. Data Analysis

Quantitative and qualitative approaches were combined to analyze the data. Descriptive statistics such as frequency distributions were first calculated with SPSS to provide an overview of central tendencies and patterns. Open ended answers were then analyzed qualitatively by categorizing them into thematic clusters. Initial coding was conducted by one author, and approximately 20% of the responses were independently coded by the other authors to establish intercoder reliability. This procedure followed a qualitative content analysis approach. Inter coder agreement was not calculated numerically but established through negotiated consensus, where discrepancies were discussed until a shared interpretation was reached.

Building on these coded categories, further statistical tests were conducted to deepen the analysis. T-Tests and Chi2-Tests were calculated to identify group differences, and Spearman correlations were applied to examine associations between variables. Normality was assessed through visual inspection of histograms and descriptive indicators such as skewness and kurtosis. Some deviations from perfect normality were observed, yet parametric tests were retained because the large sample size (N = 228) ensures their robustness. For Chi2-Test analyses expected cell frequencies were inspected and found to be sufficient. This combination of descriptive statistics, qualitative thematic analysis, and inferential statistical testing provided both breadth and depth in understanding the perceptions of educational stakeholders in Landak.

2.3. Participants

The study involved 228 educational stakeholders. These held various roles, with the majority being teachers alongside principals, education agency staff, and administrative personnel. Some participants held dual functions such as combining teaching with leadership responsibilities, which illustrates the range of actors engaged in or affected by EBCE implementation. Most respondents came from junior secondary schools, reflecting where EBCE is already most established and indicating that primary and senior secondary levels may require greater policy attention. Participants represented different career stages and educational backgrounds, from early career teachers with undergraduate degrees to more experienced staff with graduate qualifications. In terms of cultural identity, the sample was dominated by Dayaknese educators, consistent with the demographic composition of the region, alongside smaller groups from Malay, Javanese, and other communities. A detailed overview of the participants is presented in Table 1.

Table 1. Participants (N = 228)

Information	Sub information	Number	Percentage
Region	Urban	43	18.9
	Rural	185	81.1
Age (in years)	22-26	10	4.4
	27-31	37	16.2
	32-36	66	28.9
	37-41	42	18.4
	Above 41	73	32.1
Educational Role	Education Agency	3	1.3
	Teacher	181	79.4
	Principle	26	11.4
	Teacher and Priniciple	12	5.3
	Teacher and Other	3	1.3
	Administrative Staff	3	1.3
Ethnicity	Dayaknese	164	71.9
	Mix (Dayaknese, Others)	2	0.8
	Javanese	16	7
	Malay	28	12.3
	Others	18	7.9
Level of Education	High School	2	0.9
	Undergraduate	208	91.2
	Diploma	4	1.8
	Graduate/ Doctoral	14	6.1
Teaching Experience (in years)	1-5	61	26.7
	6-10	74	32.5
	11-15	52	22.8
	16-20	24	10.5
	More than 20	17	7.5
Level of School	Education Agency	2	0.8
	Junior Highschool	223	97.8
	Senior Highschool	3	1.4

3. Results and Discussion

The following chapter presents the key findings of this study. For a comprehensive overview, all results from the study are provided in Appendix 2.

The findings demonstrate that educators in Landak show consistently high concern about the climate crises. Statistical analyses confirm that this concern is widespread across demographic groups, with no significant differences between urban and rural educators, between school types, and across age groups. Only a slight, non-significant tendency for older educators to report higher concern was observed. These results are summarized in Table 2.

Table 2. Statistical Tests on Climate Crises Concern (N = 228)

Comparison	Test	df	Test Value	p-value	Interpretation	Effect Size	Interpretation
Urban vs. Rural	Chi2-Test	3	0.72	0.870	No significant difference	V = 0.06	Negligible effect
School Types	Chi2-Test	6	4.52	0.740	No significant difference	V = 0.08	Small effect
Age Groups	ANOVA (F)	4, N-5	2.23	0.067	No significant trend (older higher)	$\eta^2 = 0.04$	Small effect

This aligns with previous research emphasizing that educators in culturally embedded contexts, despite their age or region, often connect their professional roles with ecological vulnerability and local wisdom (Husen et al., 2022; Marsakha et al., 2021; Parhan & Dwiputra, 2023; Sitanggang et al., 2025). Especially for the Dayaknese, whose cultural identity is deeply tied to forests and land, climate crises are not an abstract concept but an immediate lived experience, which strengthens the normative basis for EBCE. This cultural embedding helps explain why concern levels were high across groups, with only minor variation by age or school type. Rather than representing differences in awareness, the results suggest a broadly shared ecological vulnerability that is shaped by cultural traditions of stewardship. Such findings resonate with the broader literature framing EBCE as a pedagogical response to crises that are not only technical but also moral and cultural (Orchard & Reiss, 2025; Prayogo et al., 2024; Wantu & Lakadjo, 2025). The slight tendency for older educators to report stronger concern may reflect longer exposure to environmental change in the region and deeper professional

involvement in community challenges, whereas younger teachers may not have accumulated similar experiences.

Despite this high awareness, the study reveals that EBCE remains only partially embedded in school practice. Educators most frequently reported local projects, extracurricular initiatives, and community-based collaborations rather than systematic curricular integration. This pattern reflects structural limitations identified in earlier studies, which point to rigid curricula, limited institutional support, and resource scarcity as major obstacles (Asri & Deviv, 2023; Zahrah & Rahmat, 2022). Differences between roles suggest that principals and authority positions were more likely to stress systemic integration and policy responsibility, while teachers emphasized classroom constraints and immediate resource deficits. This indicates that institutional roles strongly shape perceptions of EBCE. Principals and agency staff could have been more inclined to highlight policy coherence and accountability since they operate closer to national frameworks, while teachers could have focused on everyday feasibility because of their daily experience with overloaded curricula and scarce resources. Recent research also highlights the role of school leadership in overcoming such barriers, showing that principals who provide resources and clear vision can significantly improve the institutionalization of EBCE (Zainuddin & Agus, 2025). EBCE in Indonesia has long been emphasized as a continuous national priority (Nuraeni & Idawati, 2020), and EBCE was officially launched in 2006 through a memorandum between the Ministries of Education and Environment. Yet these frameworks seem to have not been translated into consistent school-level implementation, particularly in rural areas where resources, despite ecological vulnerability, remain scarce.

The perceived need for stronger integration is unequivocal. Almost all respondents rated integration as important or very important, with more than 60% supporting ecology as a mandatory subject. Urban educators valued integration more highly than rural educators, and educators in authority positions also expressed stronger support. The way responses were framed influenced judgments: direct local observations were linked to lower ratings, while attributing responsibility to external actors was associated with higher ratings. This divergence highlights a tension between perspectives rooted in local constraints and those oriented toward systemic accountability, which reflects both urban–rural resource differences and varying interpretations of responsibility. One explanation could be that urban schools benefit from denser NGO networks, more training opportunities, and better digital access, which might make integration appear more feasible and desirable. Rural educators could experience limited infrastructure and fewer partnerships, which might explain why they judged integration as less realistic. Respondents who focused on direct local conditions could have been discouraged by immediate shortages, whereas those who stressed external responsibility might have felt that systemic actors should ensure stronger integration. This echoes findings which argue that transformative learning requires systemic reinforcement to move from awareness to concrete action (Yusuf & Fajari, 2025). The statistical tests that support these findings are presented in Table 3.

Table 3. Statistical Tests on Perceived Need for Integration (N = 228)

Comparison / Factor	Test	df	Test value	p-value	Interpretation	Effect Size	Interpretation
Urban vs. rural educators	Chi-square	2	8.43	.015	Significant difference (urban higher)	V = 0.19	Negligible effect
	t-test	—	-2.90	.005	Significant difference (urban higher)	d = -0.49	Medium effect
School types (authority vs. others)	Chi-square	4	17.67	.001	Significant difference (authority positions higher)	V = 0.14	Small effect
Reliance on direct local observations	Spearman correlation	—	-3.07	.003	Negative association with perceived integration need	p = -0.2	Small negative effect
Responsibility attributed externally	Spearman correlation	—	2.38	.036	Positive association with perceived integration need	p = 0.16	Small positive effect

The barriers for further integration reported by participants confirm persistent structural and systemic challenges. In the open-ended survey items, lack of training was cited by roughly one third of respondents, often described as the absence of specific EBCE workshops. Limited resources were highlighted by more than a quarter, frequently referring to missing digital tools and teaching materials. Governmental support was portrayed as distant or insufficient, and some respondents emphasized that EBCE felt like an “extra burden” added to their workload. Financial constraints and low student engagement were also mentioned, though less frequently. These obstacles echo the broader literature, which highlights that responsibility for EBCE is often perceived as diffuse, leading to fragmented and unsustainable initiatives (Asri & Deviv, 2024; Orchard & Reiss, 2025). Together these insights suggest not only the absence of systemic support but also differing constructions of responsibility. While some educators stress structural deficits, others present EBCE as a matter of individual commitment. Although EBCE is strongly supported in Indonesian policy frameworks such as the Adiwiyata

program (Nuraeni & Idawati, 2020), and the Environmental Law (Maryani, 2016), implementation at the school level is hindered by a lack of systemic backing. Educators in Landak are therefore situated between strong normative expectations and practical constraints, reflecting the tension between national visions of EBCE and local realities (Wahyuni et al., 2024). However, evidence shows that schools that embed environmental values into their EBCE frameworks report higher levels of student engagement and responsibility, suggesting that cultural values can mitigate structural barriers to some extent (Japar et al., 2024). A possible explanation could be that teachers feel responsible for moral education but receive little structural help, which might make them emphasize their own commitment despite limited capacity. The finding that some schools nevertheless manage to integrate EBCE could be linked to cultural traditions and community involvement that help mitigate institutional gaps, as suggested by research showing higher student responsibility and engagement when environmental values are embedded (Japar et al., 2024).

At the same time, participants identified clear success factors that resonate strongly with existing research. Project-based and experiential learning approaches were most frequently emphasized, aligning with literature that highlights their transformative potential (Sitanggang et al., 2025; Zahrah & Rahmat, 2022). Respondents also noted the value of digital tools and media, which can enhance motivation and access, echoing findings on the importance of digital competencies in environmental education (Mawaddah et al., 2025; Sitanggang et al., 2025). Interdisciplinary integration was seen as a promising strategy to embed environmental themes across subjects, reinforcing the idea that EBCE works best as a cross-cutting principle rather than a stand-alone discipline (Jordan et al., 2023). This is further supported by case studies of Adiwiyata schools, which show that environmental education initiatives not only improve environmental knowledge but also foster character traits such as empathy, cooperation, and responsibility among students (Nada et al., 2021). Moreover, cooperation with parents, NGOs, local leaders, and government agencies was consistently mentioned as crucial, reflecting arguments that sustainability education requires intersectoral partnerships (Marsakha et al., 2021; Prayogo et al., 2024; Zahrah & Rahmat, 2022). One reason for this emphasis could be that schools in rural areas rely heavily on community resources and cultural traditions such as Dayaknese forest stewardship, while urban schools might draw more on external organizations and digital tools. This combination could explain why respondents highlighted both cultural grounding and technological support as equally important for EBCE.

Taken together, the results reveal a paradox. With regard to the first research question, educators in Landak perceive EBCE as highly important and broadly adequate in principle, as reflected in their strong concern about environmental issues and their normative commitment to integrating them into education. Concerning the second research question, however, the findings show that systemic barriers such as insufficient training, limited resources, and unclear responsibilities continue to hinder implementation, even though stakeholders also highlight concrete success factors including experiential learning, digital tools, interdisciplinary teaching, and community cooperation. Addressing the third research question, these perceptions are clearly rooted in local cultural contexts, particularly the Dayaknese tradition of environmental stewardship, while at the same time they point to the need for alignment with national policy frameworks and institutional support (Deviv, 2024; Japar et al., 2024; Husen et al., 2022; Nada et al., 2021; Nurkhin et al., 2025; Wantu & Lakadjo, 2025; Zainuddin & Agus, 2025).

Two important limitations must be acknowledged. One limitation is the dominance of junior secondary school teachers in the sample which may reduce the generalizability of the results to other school levels. Another limitation is the reliance on self reported perceptions which may reflect normative expectations rather than actual practices. These factors should be considered when interpreting both the reported barriers and the identified success factors.

If adequately supported by policy and resources, the identified success factors could provide the foundation for a more comprehensive transformation that bridges local wisdom with Indonesia's broader educational ambitions and global sustainability imperatives.

4. Conclusion

This study examined the perceptions of educational stakeholders in Landak regarding the relevance, adequacy, and implementation of EBCE. Awareness of the climate crises was consistently high across demographic groups, and educators expressed strong normative commitment to EBCE. Yet integration into practice remained fragmented, with activities limited to projects and collaborations rather than systematic curricular embedding. At the same time, stakeholders identified success factors such as project-based learning, digital tools, interdisciplinary approaches, and community partnerships, underscoring the potential of EBCE if bottom-up innovations receive institutional support. These findings should be read with caution. The focus on a single region limits generalizability, especially given the influence of Dayak cultural values on environmental attitudes. The reliance on self-reports risks bias, and the emphasis on educators narrows the range of perspectives. While the qualitative design provided depth, it restricts the quantification of barriers and prevents causal inference. Temporal changes since data collection may also affect the current relevance of the findings.

Despite these limitations, the Landak case offers insights for both policy and practice. Future studies should extend to diverse regions, include multiple stakeholders, and use longitudinal or mixed-method approaches. At the practical level, the findings support the development of EBCE training modules that integrate local wisdom, targeted investment in teacher training programs that address environmental literacy, and the strengthening of the Adiwiyata initiative in secondary schools. They also point to the need for policy frameworks that ensure clear institutional responsibilities and stable resource provision. Systematic support for project-based and culturally grounded initiatives could further enhance implementation and alignment with local strengths. Aligning local motivation with national policy thus represents a promising pathway for embedding environmental responsibility in Indonesian education and beyond.

Author Contributions

To ensure transparency, the contributions of each author to this article are described as follows: Carla Hermanussen: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. Dian Febrianti: Investigation, Software, Methodology, Data curation, Writing – review. Mustika Aji Hertanto: Conceptualization, Writing – review.

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The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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