

The Role of Education Governance in Developing Awareness and Understanding of Climate Change Education in Prospective Teachers

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ARTICLE INFO	ABSTRACT
Keywords: Climate Change Education; Educational Governance; Environmental Awareness; Environmental Learning; Prospective teachers	The increase in Earth's temperature, unpredictable seasonal changes, rising natural disasters, and environmental degradation indicate that climate change issues need to be addressed seriously by various sectors, including education. Climate Change Education (CCE) is an important effort in developing environmental awareness and understanding among prospective teachers as agents of change in the future. This study aims to analyze the role of educational governance in developing awareness and understanding of Climate Change Education among prospective teachers. This study employed a descriptive qualitative approach involving 17 prospective teachers students from the Faculty of Tarbiyah and Teacher Training, UIN Kiai Ageng Muhammad Besari Ponorogo. The participants were selected using purposive sampling and had previously received environment-related learning. Data were collected through a structured questionnaire using a four-point Likert scale to examine educational governance, learning environment, climate change understanding, and Climate Change Education awareness. The data were analyzed through data reduction, data display, and conclusion drawing. The findings indicate that educational management and learning environments contribute positively to strengthening students' understanding of climate change issues and encouraging the development of environmentally responsible attitudes and behaviors. In addition, the high level of awareness demonstrated by prospective teachers reflects that the integration of Climate Change Education in educational governance can support the formation of environmentally conscious future educators. Therefore, strengthening the integration of environmental materials and sustainable practical activities is necessary to enhance the effectiveness of Climate Change Education implementation.

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INTRODUCTION

Climate change is a global environmental issue that has received a lot of attention because its impact is felt directly in human life. The rise in global temperature, indeterminate seasonal changes, increasing natural disasters, and environmental damage show that efforts to handle climate change not only require technological and policy approaches, but also education that is able to build public knowledge and awareness of environmental issues in a sustainable manner¹.

Education has a strategic position in forming a generation that is able to understand environmental problems and participate in climate change mitigation and adaptation efforts. In this context, ClimateChange Education (CCE) is present as an educational approach that aims to improve climate literacy, scientific understanding, and concern for the environment. Climate change education is not only oriented to knowledge transfer, but also to the formation of values, attitudes, and actions that support sustainable development. Therefore, the implementation of CCE is increasingly important to be applied to various levels of education².

One of the groups that has an important role in the implementation of Climate Change Education is prospective teachers students. As future educators, they are expected not only to understand the concept of climate change, but also to be able to integrate the issue into the learning process when entering the workforce. This ability is important because teachers have a great influence in shaping the character and behavior of students in the environment. Prospective teachers who have good climate literacy will be better prepared to instill sustainability values to the next generation³.

Nevertheless, various studies show that the implementation of climate change education in universities still faces a number of obstacles. Materials related to climate change have not been fully integrated into the curriculum, while learning activities that provide hands-on experience on environmental issues are still limited. As a result, students' understanding is often only at the conceptual level and has not developed into competencies that can be applied in daily life and educational practices. This condition shows that the success of Climate Change Education is not only determined by the learning materials, but also by the education management system that supports the creation of a conducive learning

¹ Katherine Calvin et al., *IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (Eds.)]*. IPCC, Geneva, Switzerland, First, ed. Paola Arias et al., with Hoesung Lee (Intergovernmental Panel on Climate Change (IPCC), 2023), <https://doi.org/10.59327/IPCC/AR6-9789291691647>.

² UNESCO, *Greening Curriculum Guidance – Teaching and Learning for Climate Action* (UNESCO, 2024), <https://doi.org/10.54675/AOOZ1758>.

³ Sumiati Side et al., *ESD-BASED CHEMISTRY LEARNING TRANSFORMATION TO DEVELOP ENVIRONMENTAL AWARENESS OF PROSPECTIVE TEACHER STUDENTS*, 3, no. 1 (2025).

environment ⁴.

Educational governance is one of the factors that affect the quality of the learning process. Good governance includes program planning, curriculum development, provision of learning resources, and the creation of an academic environment that supports the achievement of educational goals. In the context of Climate Change Education, education governance plays a role in ensuring that climate change issues get adequate space in academic and non-academic activities. Strong institutional support can encourage students to be more active in understanding environmental issues and participating in various activities related to sustainability ⁵.

In addition to education governance, the learning environment is also an important factor in building students' awareness and understanding of climate change. A learning environment that provides opportunities for students to discuss, make observations, and engage in environmental activities has been proven to be able to increase environmental awareness of sustainable issues. Contextual learning experiences allow students to connect the concepts they learn with the problems they encounter in their daily lives so that learning becomes more meaningful ⁶.

Several previous studies have examined the relationship between environmental education and increased climate change literacy. Environment-based learning is able to increase students' understanding of sustainability issues⁷. Meanwhile, increasing environmental knowledge contributes to the formation of awareness and behavior that is more responsible for the environment. Although previous studies have examined the relationship between educational governance and Climate Change Education in higher education, most of these studies have been conducted in universities with well-established sustainability policies and institutional support. Limited attention has been given to Islamic Higher Education Institutions (PTKIN) in Indonesia, which operate under distinctive governance structures integrating academic, religious, and institutional values⁸.

⁴ David Rousell and Amy Cutter-Mackenzie-Knowles, "A Systematic Review of Climate Change Education: Giving Children and Young People a 'Voice' and a 'Hand' in Redressing Climate Change," *Children's Geographies* 18, no. 2 (March 2020): 191–208, <https://doi.org/10.1080/14733285.2019.1614532>; Muhammad Syahrudin Amin, Anna Permanasari, and Ida Hamidah, "Integrasi Low Carbon Education Dalam Kurikulum Pendidikan Calon Guru IPA di Indonesia sebagai Upaya Revitalisasi Peran Pendidikan IPA dalam Merespons Tantangan Ekologis di Masa Depan," *Jurnal IPA & Pembelajaran IPA* 4, no. 2 (December 2020): 231–43, <https://doi.org/10.24815/jipi.v4i2.17965>.

⁵ Walter Leal Filho et al., "Governance in the Implementation of the UN Sustainable Development Goals in Higher Education: Global Trends," *Environment, Development and Sustainability* 27, no. 9 (May 2023): 20695–718, <https://doi.org/10.1007/s10668-023-03278-x>.

⁶ Elizabeth Sidiropoulos, "The Influence of Higher Education on Student Learning and Agency for Sustainability Transition," *Sustainability* 14, no. 5 (March 2022): 3098, <https://doi.org/10.3390/su14053098>; Trevion S. Henderson et al., "An Exploration of the Relationship between Sustainability-Related Involvement and Learning in Higher Education," *Sustainability* 14, no. 9 (May 2022): 5506, <https://doi.org/10.3390/su14095506>.

⁷ Angga Hadiapurwa et al., "Trends in Climate Change Education Studies in the Last Ten Years: A Systematic Literature Review," *Pulpit of Knowledge* 29, no. 1 (May 2024): 32–45, <https://doi.org/10.23887/mi.v29i1.70400>.

⁸ Asep Kurnia Jayadinata, Idat Muqodas, and Dhea Ardiyanti, "Environmental awareness of prospective teachers as a character value of environmental concern," *Journal of Counseling and Education* 12, no. 2 (2024): 12–23, <https://doi.org/10.29210/1112000>.

PTKIN faces unique challenges in integrating Climate Change Education because sustainability initiatives must be aligned not only with national higher education policies but also with Islamic educational values and institutional governance practices. This distinctive context provides an opportunity to examine how education governance contributes to developing climate change understanding and awareness among prospective teachers in Islamic higher education. Therefore, this study aims to analyze the role of educational governance in developing understanding and awareness of Climate Change Education among prospective teachers students in an Indonesian PTKIN context.

The novelty of this study lies in examining the role of educational governance within an Indonesian Islamic Higher Education Institution (PTKIN) in fostering Climate Change Education awareness among prospective teachers. This study also provides empirical evidence from a relatively underexplored Islamic teacher education institution, offering practical implications for strengthening educational governance in integrating Climate Change Education within faith-based higher education. Unlike previous studies that mainly focused on general higher education institutions, this study emphasizes the unique governance context of PTKIN, where institutional policies, curriculum implementation, and Islamic educational values interact in shaping students' environmental awareness and understanding of climate change.

RESEARCH METHOD

This study employed a descriptive quantitative approach to describe the role of educational governance in developing Climate Change Education (CCE) awareness and understanding among prospective teachers students. The descriptive quantitative approach was selected because the study collected numerical data through a structured questionnaire using a four-point Likert scale and analyzed the data using descriptive statistics in the form of mean scores. This approach was chosen because it enables researchers to describe respondents' perceptions quantitatively regarding educational governance, learning environment, climate change understanding, and Climate Change Education awareness using descriptive statistical analysis.

The research will be carried out in May 2026 at the Faculty of Tarbiyah and Teacher Training UIN Kiai Ageng Muhammad Besari Ponorogo. The subjects of the study were prospective teachers students who were selected using the purposive sampling technique. A total of 17 prospective teachers students participated in this study and completed the questionnaire. This technique is used to determine respondents based on certain criteria that are in accordance with the research objectives, namely active students of education study programs who have obtained learning related to the environment or climate change and are willing to participate in the research.

The research data was collected through the distribution of questionnaires using a four-level Likert scale. The questionnaire was used to obtain information about students' perceptions of educational governance, learning environment, understanding of climate change, and awareness of Climate Change Education. Data collection is done online through

Google Form.

The research instrument was developed based on four main indicators, namely educational governance, learning environment, understanding of Climate Change, and Climate Change Education awareness. The four indicators are used to describe the role of education governance in supporting the development of students' understanding and awareness of climate change issues.

The collected data were analyzed using descriptive statistical analysis. Responses obtained from the four-point Likert scale questionnaire were tabulated and calculated to obtain the mean score for each indicator. The mean scores were then presented in tables and interpreted descriptively to explain the role of educational governance, learning environment, climate change understanding, and Climate Change Education awareness among prospective teachers students.

RESULT AND DISCUSSION

Educational Governance in Supporting Climate Change Education

Table 1. Educational Governance Assessment Results

Yes	Research Variable	Average
	Educational Management	
1	My institution has policies that support learning about climate change	3,06
2	The curriculum I study includes material on climate change	2,76
3	Lecturers/teachers integrate climate change issues into learning	2,82
4	The institution provides facilities that support environmentally-based	3,06
5	There are campus/school programs or activities related to environmental preservatio	3,42
Average		3,02

Based on Table 1, the variable of educational governance obtained an average score of 3.02, which falls into the good category. This finding indicates that educational governance has made a positive contribution to supporting Climate Change Education (CCE) for prospective teachers students. Educational governance plays a key role in formulating institutional policies, developing curricula, providing learning resources, and organizing programs that support sustainable education. Higher education institutions with well-implemented sustainability governance are more likely to build an academic environment that fosters environmental awareness and responsible behavior among students⁹.

The highest average score was found for the indicator of environmental preservation programs and activities, reaching 3.42. This shows that students perceive the existence of

⁹ Kuok and Daniel Tang, "A Model of Behavioral Climate Change Education for Higher Educational Institutions," *Environmental Advances* 9 (October 2022): 100305, <https://doi.org/10.1016/j.envadv.2022.100305>.

various campus activities that encourage environmental concern, such as campus greening, waste management, environmental campaigns, and other sustainability initiatives. Participating directly in these activities enables students to understand climate change issues more clearly while strengthening their sense of care for the environment. Such programs are proven to increase student engagement and support the achievement of sustainability education goals¹⁰

Indicators regarding institutional policies supporting climate change learning and the provision of environment-based learning facilities both obtained the same average score of 3.06. This reflects that students have experienced sufficient institutional support for environmental education. This support may take the form of formal policies, adequate infrastructure, and various activities that promote sustainability practices within the academic environment. Strong institutional commitment is a critical factor in ensuring the success of environmental education, as it helps build an academic culture that encourages positive changes in student behavior and awareness¹¹.

On the other hand, the indicator of climate change content in the curriculum obtained the lowest average score at 2.76, followed by the indicator of integration by lecturers, with an average of 2.82. This result reveals that climate change topics have not yet been fully integrated into the learning process. In fact, embedding sustainability and climate change issues into the curriculum is essential to equip students with the competencies needed to address global environmental challenges. Transforming curricula toward sustainability requires strong institutional commitment, cross-disciplinary collaboration, and the development of learning strategies that provide a comprehensive understanding of environmental issues¹².

Overall, the results confirm that educational governance has a positive role in supporting CCE for prospective teachers. However, further efforts are required to strengthen the integration of climate change topics into the curriculum and daily learning practices. Effective CCE requires not only policy support but also consistent implementation across various learning activities, so that students gain the understanding, awareness, and motivation needed to support environmental sustainability. Strengthening educational governance is therefore a vital strategy to prepare future teachers with sufficient environmental literacy to act as agents of change¹³.

Learning Environment in Supporting Climate Change Education

Table 2. Learning Environment Assessment Results

Yes	Research Variable	Average
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¹⁰ Walter Leal Filho et al., “Handling Climate Change Education at Universities: An Overview,” *Environmental Sciences Europe* 33, no. 1 (December 2021): 109, <https://doi.org/10.1186/s12302-021-00552-5>.

¹¹ Sidiropoulos, “The Influence of Higher Education on Student Learning and Agency for Sustainability Transition.”

¹² Filho et al., “Governance in the Implementation of the UN Sustainable Development Goals in Higher Education.”

¹³ Henderson et al., “An Exploration of the Relationship between Sustainability-Related Involvement and Learning in Higher Education.”

	Learning environment	
1	My institution has policies that support learning about climate change	3,12
2	The curriculum I study includes material about climate change	3,47
3	Lecturers/teachers integrate climate change issues into learning	2,76
4	The institution provides facilities that support environmentally-based learning	2,94
5	There are programs or campus/school activities related to environmental conservation	3,29
Average		3,12

Based on Table 2, the learning environment variable obtained an average score of 3.12, also categorized as good. This means that the existing learning environment has supported the development of students' understanding and awareness of climate change. The learning environment includes not only interactions in the classroom but also the curriculum, facilities, and academic activities that enable contextual and meaningful learning. A positive environment helps students develop critical thinking, raise environmental awareness, and build attitudes that support sustainability¹⁴.

The highest score in this section was recorded for the indicator of climate change content in the curriculum, with an average of 3.47. This shows that students have been exposed to climate change topics during their studies. Including such content in the curriculum is a fundamental step in building environmental literacy and increasing understanding of the causes, impacts, and mitigation strategies of climate change. Education that integrates environmental issues helps students understand sustainability in a more comprehensive and applicable way¹⁵.

Indicators of environmental activities and programs obtained an average score of 3.29, while institutional support for learning received 3.12. These scores indicate that students perceive adequate support from the academic environment to implement CCE. Practical activities allow students to experience real-world environmental issues and encourage them to participate directly in finding solutions. Involvement in sustainability activities also strengthens awareness and contributes to achieving Sustainable Development Goals¹⁶.

Conversely, the indicator of integration by lecturers obtained the lowest score at 2.76, and the provision of learning facilities scored 2.94. This suggests that even though climate change topics are present in the curriculum, their practical application in the classroom is still limited. Lecturers do not always connect subject matter with climate issues, leaving students with limited opportunity to see the relevance of these topics across different disciplines. One major challenge in higher education is the gap between institutional policies and actual

¹⁴ Filho et al., "Governance in the Implementation of the UN Sustainable Development Goals in Higher Education."

¹⁵ Hadiapurwa et al., "Trends in Climate Change Education Studies in the Last Ten Years."

¹⁶ Tang, "A Model of Behavioral Climate Change Education for Higher Educational Institutions."

teaching practices¹⁷.

In summary, the learning environment contributes positively to the development of CCE among prospective teachers. However, improvements are needed in how lecturers deliver the content and in the provision of supporting facilities. A comprehensive learning environment will better equip future teachers with the competencies required to teach climate change and sustainability topics effectively to their own students¹⁸.

Understanding Climate Change

Table 3. Understanding Climate Change Assessment Results

Yes	Research Variable	Average
	Understanding Climate Change	
1	I understand the basic concept of Climate Change	3,18
2	I know the main causes of Climate Change	3,12
3	I understand the impacts of Climate Change	3,29
4	I know how to reduce the impacts of Climate Change	3,06
5	I am able to explain Climate Change to others	3,18
Average		3,17

Based on Table 3, the variable of climate change understanding obtained an average score of 3.17, which is categorized as good. This indicates that prospective teachers already possess sufficient basic knowledge regarding climate change, including its concepts, causes, impacts, and mitigation strategies. This understanding is essential, as future teachers will serve as key figures in transferring environmental knowledge to students and communities. Strong understanding helps them design relevant learning materials and contribute to building climate literacy among the next generation¹⁹.

The highest score was found for understanding the impacts of climate change, with an average of 3.29. This result suggests that students are well aware of consequences such as rising temperatures, changing weather patterns, increasing natural disasters, and ecosystem disruption. This awareness may be influenced by widespread access to information through digital media and learning resources. It confirms that climate change is already recognized as a major global challenge by students²⁰.

¹⁷ Side et al., *TRANSFORMASI PEMBELAJARAN KIMIA BERBASIS ESD UNTUK MENGEMBANGKAN KESADARAN LINGKUNGAN MAHASISWA CALON GURU*.

¹⁸ Alexandra E. Ioannou, Enrico F. Creaco, and Chrysi S. Laspidou, "Exploring the Effectiveness of Clustering Algorithms for Capturing Water Consumption Behavior at Household Level," *Sustainability* 13, no. 5 (March 2021): 2603, <https://doi.org/10.3390/su13052603>.

¹⁹ P. Molthan-Hill and L. Blaj-Ward, "Assessing Climate Solutions and Taking Climate Leadership: How Can Universities Prepare Their Students for Challenging Times?," *Teaching in Higher Education* 27, no. 7 (October 2022): 943–52, <https://doi.org/10.1080/13562517.2022.2034782>.

²⁰ Filho et al., "Governance in the Implementation of the UN Sustainable Development Goals in Higher Education."

Understanding of basic concepts and the ability to explain these concepts to others both scored 3.18. This means students do not only understand the theory but also have sufficient communication skills to share their knowledge an important competency for educators. Effective communication supports the development of climate literacy and sustainability values in educational settings²¹.

However, knowledge of the causes of climate change scored 3.12, while knowledge of mitigation strategies received the lowest score at 3.06. This indicates that students' understanding is still stronger at the theoretical level than in practical application. Therefore, learning should be directed more toward developing concrete strategies that students can apply in daily life. Strengthening practical knowledge ensures that learning outcomes are not only theoretical but also translated into actions that support environmental sustainability²².

In conclusion, prospective teachers have a relatively good understanding of climate change, but improvements are still needed regarding practical solutions and mitigation actions. Higher education institutions should provide more contextual and experience-based learning, allowing students to connect theory with real-world problems. This way, they will be ready to contribute meaningfully to sustainable development in the future²³.

Climate Change Education Awareness

Table 4. Climate Change Education Awareness Assessment Results

Yes	Research Variable	Average
	Awareness of Climate Change Education	
1	I care about Climate Change.	3,41
2	I feel a responsibility to protect the environment.	3,94
3	I intend to apply environmentally friendly behavior in daily life.	3,94
4	I try to reduce activities that harm the environment.	4
5	I encourage others to care about the environment.	3,59
Average		3,78

Based on Table 4, the variable of awareness of CCE obtained the highest average score of all variables, reaching 3.78, which falls into the very good category. This demonstrates that prospective teachers have a strong level of concern for climate change and environmental preservation. High awareness is a valuable asset in supporting CCE

²¹ Maria Ojala, "Climate-Change Education and Critical Emotional Awareness (CEA): Implications for Teacher Education," *Educational Philosophy and Theory* 55, no. 10 (August 2023): 1109–20, <https://doi.org/10.1080/00131857.2022.2081150>.

²² Inés Suárez-Perales et al., "Educating for the Future: How Higher Education in Environmental Management Affects pro-Environmental Behaviour," *Journal of Cleaner Production* 321 (October 2021): 128972, <https://doi.org/10.1016/j.jclepro.2021.128972>.

²³ Ye Wu, Jiawei Wan, and Wen Yu, "Impact of Environmental Education on Environmental Quality under the Background of Low-Carbon Economy," *Frontiers in Public Health* 11 (February 2023): 1128791, <https://doi.org/10.3389/fpubh.2023.1128791>.

implementation, as it is one of the main factors shaping pro-environmental behavior. Students with good awareness tend to value sustainability and actively participate in conservation efforts²⁴.

The highest score of 4.00 was obtained for the statement “*I make efforts to reduce activities that harm the environment*”. This shows that students do not only understand the importance of environmental protection but also apply it in daily life, such as reducing plastic waste, saving energy, and choosing sustainable lifestyles. This behavior reflects a strong commitment to minimizing negative environmental impacts²⁵.

Indicators regarding responsibility for the environment and intention to practice green habits both scored 3.94. These results confirm that students feel a strong sense of duty toward environmental preservation. Awareness accompanied by intention to act serves as the foundation for consistent and sustainable behavior, both in personal life and professional practice²⁶.

The lowest scores in this section were found for general concern about climate change (3.41) and encouraging others to care for the environment (3.59). Although still categorized as very good, these results suggest that while students are personally aware, they may not always be active in influencing or motivating others. Yet, as future educators, the ability to disseminate sustainability values is a core competency, as teachers play a key role in shaping the awareness of their students and communities²⁷.

Overall, awareness of CCE is the strongest dimension measured in this study. This high level of concern provides a strong basis for developing more action-oriented and practical CCE programs. Therefore, institutions should continue supporting learning activities and campus initiatives that encourage students not only to understand climate change but also to actively promote sustainable development²⁸.

CONCLUSION

The findings indicate that educational governance, learning environment, and climate change understanding among prospective teachers were generally at a good level, while Climate Change Education awareness reached a very good level. These results suggest that prospective teachers already possess a positive level of awareness and concern regarding

²⁴ Mathilde Vandaele and Sanna Stålhammar, “‘Hope Dies, Action Begins?’ The Role of Hope for Proactive Sustainability Engagement among University Students,” *International Journal of Sustainability in Higher Education* 23, no. 8 (December 2022): 272–89, <https://doi.org/10.1108/IJSHE-11-2021-0463>.

²⁵ Obaidullah Nadeem and Mariyum Nawaz, “Climate Change and Sustainable Development Perceptions of University Students in Lahore, Pakistan,” *International Research in Geographical and Environmental Education* 32, no. 3 (July 2023): 181–96, <https://doi.org/10.1080/10382046.2022.2154973>.

²⁶ Filho et al., “Governance in the Implementation of the UN Sustainable Development Goals in Higher Education.”

²⁷ Efrat Eilam, “Considering the Role of Behaviors in Sustainability and Climate Change Education,” *Frontiers in Psychology* 15 (April 2025): 1394326, <https://doi.org/10.3389/fpsyg.2024.1394326>.

²⁸ Filho et al., “Governance in the Implementation of the UN Sustainable Development Goals in Higher Education.”

environmental sustainability and climate change issues.

The educational governance implemented by higher education institutions has contributed to creating a learning environment that supports the development of climate change understanding through curriculum content, institutional policies, and environmental programs. However, several aspects still require improvement, particularly the integration of climate change issues into classroom instruction and the provision of facilities that support environmentally based learning. Strengthening these components is essential to ensure that climate change education is not only introduced conceptually but also applied consistently within the learning process.

Furthermore, the findings reveal that prospective teachers demonstrate a relatively good understanding of climate change concepts, causes, impacts, and mitigation efforts. Nevertheless, their understanding of practical actions and climate change mitigation strategies still needs further enhancement. This indicates the need for more contextual and experience-based learning approaches that encourage students to connect theoretical knowledge with real-world environmental challenges.

One important contribution of this study lies in its focus on the context of an Indonesian Islamic Higher Education Institution (PTKIN), where the implementation of Climate Change Education is influenced not only by institutional governance but also by Islamic educational values and organizational characteristics. Unlike many previous studies conducted in general universities, this research demonstrates that governance within PTKIN has distinctive opportunities and challenges in integrating Climate Change Education into curriculum, campus programs, and learning environments.

These findings suggest that strengthening institutional governance in PTKIN should not merely emphasize environmental policies but also integrate sustainability values with Islamic educational principles to prepare prospective teachers who are environmentally responsible and capable of promoting sustainable development within their communities. Therefore, this study contributes contextual evidence to the growing literature on Climate Change Education by highlighting how local institutional characteristics influence the implementation of sustainability education.

This study has several limitations. First, the research involved only 17 prospective teacher students from one Islamic Higher Education Institution (PTKIN), so the findings cannot be generalized to all prospective teachers in Indonesia. Second, the study relied on self-reported questionnaire data, which may not fully reflect actual environmental behaviors. Future studies are recommended to involve larger samples from different universities and combine survey data with interviews or observations to obtain more comprehensive findings.

Based on these findings, university administrators are encouraged to strengthen institutional policies that integrate Climate Change Education across curricula, provide professional development for lecturers, increase environmentally based learning facilities, and expand campus sustainability programs. Such initiatives are expected to improve prospective teachers' competencies in addressing climate change through education.

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