



CLIMATE CHANGE EDUCATION PRACTICES IN PHILIPPINE SECONDARY SCHOOLS: CRITICAL NARRATIVE REVIEW

Robert Kevin A. Alindayu

College of Arts and Sciences, Bataan Peninsula State University, Balanga City, Bataan, Philippines

ABSTRACT

Climate change disrupts the Philippine educational system through typhoons, flooding, extreme heat, class suspensions, and reduced learning time, making climate change education an important area of basic education practice. This study synthesized literature on climate change education practices in Philippine secondary schools from 2021 to 2026. Using a critical narrative review design, the study examined selected literature related to classroom instruction, school-based environmental programs, learner participation, teacher readiness, and community-linked practices. Thematic synthesis was used to identify recurring patterns across the reviewed studies. Findings revealed that climate change education is reported through science instruction, greening initiatives, environmental activities, and disaster-related practices. However, these efforts remain fragmented. Classroom lessons, school programs, and community initiatives are not always connected, contributing to a persistent gap between learner awareness and sustained climate action. Teacher readiness, instructional resources, school leadership, and home–school–community linkage also emerged as important conditions for stronger implementation. The study concludes that climate change education in Philippine secondary schools should move beyond awareness-building toward a cohesive, practice-based approach that connects classroom learning, school-based action, and community participation.

Keywords: *Climate change education, Climate literacy, Critical narrative review, environmental education, Philippine secondary schools, school-based practices*

INTRODUCTION

The Philippines is among the countries most vulnerable to climate-related hazards, making climate change a direct concern for schooling and learning continuity. Climate-health studies identify the country as having a very high disaster risk due to its exposure to cyclones, floods, droughts, and sea-level rise, with a large share of the population and land area at risk from climate-sensitive hazards (De Guzman et al., 2025). Coastal and low-lying communities face threats from storm surges and flooding, which compound the vulnerability of households, schools, and local infrastructure (Alcantara et al., 2023). In the basic education sector, public schools experience recurring exposure to extreme weather and frequent use of school buildings as evacuation centers, which can negatively affect school performance (David et al., 2018). These findings demonstrate that climate vulnerability in the Philippines is not merely an environmental or public health issue; it also affects school operations, instructional time, and learning outcomes (Alcantara et al., 2023; David et al., 2018; De Guzman et al., 2025).

Climate-related disruptions may widen learning gaps by reducing learners' access to regular instruction. Typhoons and floods often result in sudden class cancellations, damaged facilities, utility interruptions, and the temporary conversion of classrooms into evacuation centers (David et al., 2018; Lagmay & Rodrigo, 2022). Research examining student engagement during consecutive typhoons in late 2020 found that online learning participation among Filipino students was significantly and negatively affected by these disasters (Lagmay & Rodrigo, 2022). This finding shows that shifting to digital modalities does not fully protect education from climate-related disruption. When severe weather interrupts connectivity and destabilizes home environments, students lose opportunities for teacher guidance, peer interaction, practice, and feedback, which may contribute to diminished learning time and persistent learning gaps (David et al., 2018; Lagmay & Rodrigo, 2022; Venegas Marin et al., 2024).

Climate change also affects learning environments through extreme heat. Heatwaves can damage school infrastructure, create unsafe classroom conditions, and impair learners' concentration, memory, physical health, and mental well-being (UNICEF, 2025; Venegas Marin et al., 2024). In the Philippines, extreme heat has already forced class suspensions and shortened learning hours during periods when classroom temperatures became unsafe for learners and teachers (Portugal, 2024). These disruptions indicate that climate change education cannot be treated merely as supplemental curriculum content. Instead, it should be linked to learners' lived experiences of heat stress, school closures, disrupted routines, and community adaptation (Lagmay & Rodrigo, 2022; UNICEF, 2025; Venegas Marin et al., 2024).

Effective climate change education should move beyond passive awareness and factual recall toward action-oriented, locally grounded, and interdisciplinary learning. Aeschbach et al. (2025), in a meta-analysis of climate education interventions in formal primary and secondary schools, found significant positive effects on climate literacy, but noted that interventions influenced knowledge more strongly than attitudes and behavior. This suggests that knowledge-based instruction alone may be insufficient for supporting

sustained climate action. Similarly, Guimerà-Ballesta et al. (2026) reported that secondary school climate education frequently remains fragmented, science-centered, and detached from learners' agency, emotions, and local action. These trends support the need to examine actual educational practices, including active teaching strategies, student-led initiatives, and community-linked projects, rather than evaluating climate change education only through policy mandates or curriculum frameworks (Aeschbach et al., 2025; Guimerà-Ballesta et al., 2026).

This gap between knowledge and behavior is also evident in local education literature. Fulmaran (2024) found that although junior and senior high school students showed satisfactory environmental knowledge and positive attitudes toward global warming, knowledge was not significantly related to ecological practices. In terms of instructional delivery, Romero (2025) reported that public secondary science teachers demonstrated readiness and positive perceptions toward integrating Sustainable Development Goal 13, but also reported low familiarity with the framework, resource constraints, and lack of specialized training. Espinosa et al. (2026) further showed that school-based initiatives such as environmental clubs, greening activities, and Water, Sanitation, and Hygiene programs provide important entry points for climate-related learning, but their continuity depends on alignment among school, home, and community systems. These representative studies suggest that climate change education is already present in basic education, but its implementation remains uneven across classroom instruction, school-based programs, teacher readiness, and student engagement.

Despite the growing body of literature, research remains fragmented regarding a cohesive, practice-based synthesis of climate change education in secondary schools. Existing studies commonly examine climate knowledge, greening programs, teacher readiness, or curriculum integration as separate areas of inquiry (Espinosa et al., 2026; Fulmaran, 2024; Romero, 2025). Less attention has been given to how these components—classroom pedagogy, school-wide actions, localized examples, student participation, and community adaptation—intersect in actual practice. This gap is important because secondary schools operate in a climate-vulnerable context where overlapping environmental stresses may reduce instructional time and intensify learning inequities (David et al., 2018; De Guzman et al., 2025; Lagmay & Rodrigo, 2022). A practice-focused review is therefore needed to clarify which approaches are reported in the literature, how they are implemented, what challenges limit their continuity, and how schools can strengthen climate change education in response to local climate realities.

This study synthesized literature from 2021 to 2026 on climate change education practices in Philippine secondary schools. Policies and mandates were treated only as contextual background. The review examined classroom-based, school-based, and community-linked practices, including teaching strategies, student activities, school environmental programs, teacher readiness barriers, and practice-based recommendations. The synthesis produced a localized roadmap for educators, school heads, curriculum designers, and researchers seeking to strengthen climate resilience in secondary education.

Research Objectives

The objectives of this study are as follows:

1. To categorize and analyze climate change education practices reported across classroom-based, school-based, and community-linked settings.
2. To examine the teaching strategies, learner activities, assessment practices, and teacher readiness factors documented in the reviewed literature.
3. To synthesize the implementation challenges and systemic barriers affecting climate change education practices.
4. To formulate practice-based recommendations for strengthening climate change education in Philippine secondary schools.

METHODOLOGY

This study used a critical narrative review design to synthesize recent literature on climate change education practices in secondary schools. The design was appropriate because the study aimed to interpret and compare reported practices rather than statistically aggregate findings or claim exhaustive coverage of all available literature. The review focused on classroom instruction, school-based environmental programs, learner participation, teacher readiness, and home–school–community linkages. Narrative reviews can be rigorous when they have a clear purpose, transparent search process, defined criteria, and coherent synthesis (Baethge et al., 2019; Snyder, 2019; Sukhera, 2022).

A targeted rapid review search process was used to locate open-access, full-text, peer-reviewed studies published from 2021 to 2026. Search sources included general web search results and academic platforms such as Philippine E-Journals, Journal of Interdisciplinary Perspectives, Psychology and Education: A Multidisciplinary Journal, Scimatic, DOAJ, Cambridge Core, Atlantis Press, Zenodo, Consortia Academia, IAES International Journal of Evaluation and Research in Education, DDOSC Multidisciplinary Research Journal, and the Journal of Sustainability. The search used combinations of terms such as “climate change education,” “secondary schools,” “Philippines,” “climate literacy,” “climate action,” “science instruction,” “education for sustainable development,” “school-based environmental programs,” “teacher readiness,” and “learner participation.” Related terms such as “environmental education,” “global warming,” “school greening,” “Youth for Environment in Schools Organization,” “disaster risk reduction education,” and “climate action” were also used when needed.

Studies were included if they were published from 2021 to 2026, set in the Philippine education context, available in full text or extended abstract form, and relevant to secondary or basic education, with clear relevance to secondary schools. Eligible studies had to report at least one practice-related element, such as classroom pedagogy, learner participation, teacher readiness, school-based environmental or climate programs, or home- or community-linked practice. Studies were excluded when they were

policy-only, curriculum-only without implemented practice, tertiary-only, elementary-only without clear transferability, inaccessible in full text, duplicate records, or lacking sufficient practice-related data. General climate science studies without an education component and non-scholarly sources were also excluded from the main corpus.

The selection process followed four stages: identification, screening, eligibility assessment, and final inclusion. A total of 58 records were identified from the returned search results and screened based on titles, abstracts, keywords, and metadata. From these records, 23 full texts or extended abstracts were assessed for eligibility. After applying the inclusion and exclusion criteria, 15 studies were retained for thematic synthesis. The final corpus consisted of 13 core practice studies and 2 support studies. The core studies directly reported classroom practice, school-based environmental activity, learner participation, teacher readiness, or school–community implementation. The support studies provided relevant conceptual and pedagogical framing for environmental education, Education for Sustainable Development, and knowledge–behavior relationships.

Figure 1 presents the study selection process. Because database interfaces did not consistently provide stable platform-wide counts of results, the figure reports records identified and screened from returned search pages rather than total database hits.

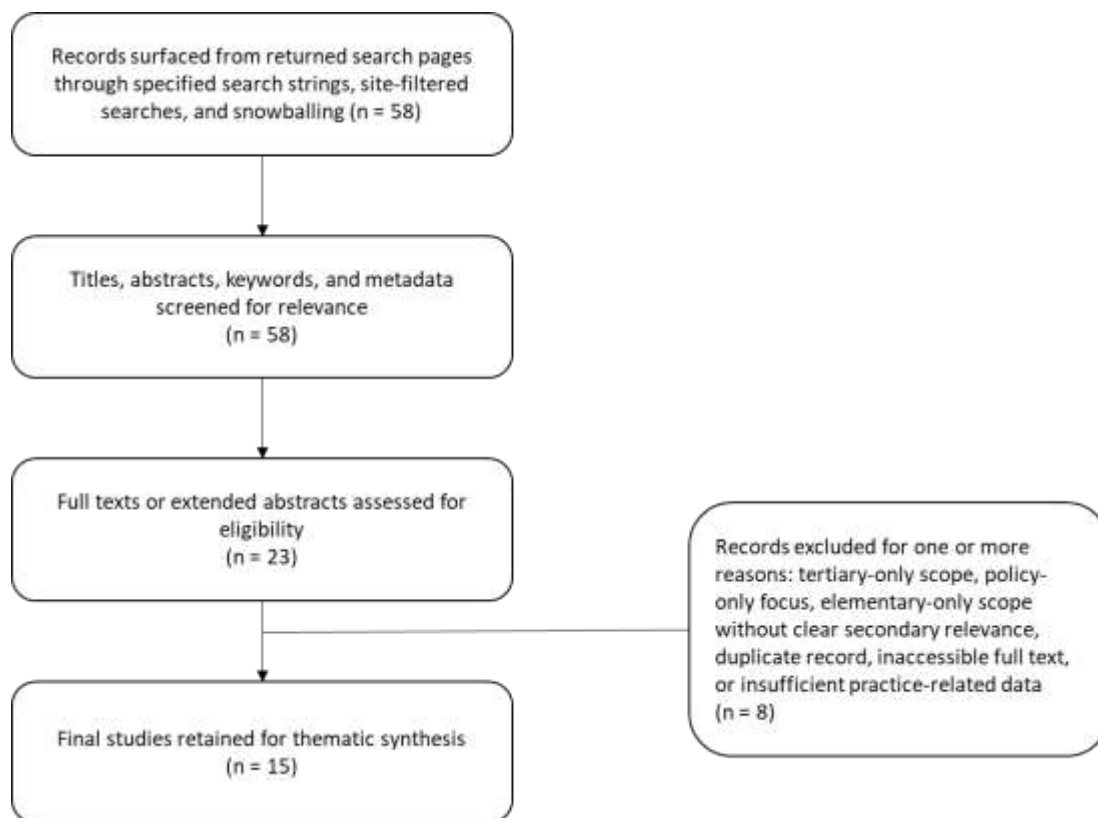


Figure 1. Study selection flow.

A data extraction matrix was prepared to organize the author and year, study context, research design, participants or data source, climate change education focus, reported practices, key findings, challenges, relevance to the review, and classification as a core or support study. The matrix allowed comparison across studies and helped identify recurring patterns in classroom-based, school-based, learner-centered, teacher-related, and community-linked practices.

The extracted data were analyzed using thematic synthesis. Following Thomas and Harden's (2008) model, the analysis involved coding extracted findings, developing descriptive themes, and generating analytical themes. Braun and Clarke's (2006) thematic analysis procedure also guided familiarization, coding, theme review, theme definition, and reporting. Initial codes included classroom integration, climate literacy, knowledge–action gap, teacher readiness, technology use, contextualized instruction, project-based learning, school greening, waste segregation, recycling, tree planting, disaster preparedness, learner participation, and home–school–community linkage. These codes were grouped into five analytical themes: climate change education as classroom integration; school-based environmental action as climate education practice; learner awareness and the knowledge–action gap; teacher readiness and implementation constraints; and home–school–community linkage as a condition for sustained practice.

The review was limited to peer-reviewed studies published from 2021 to 2026 and to sources accessible in full-text or extended abstract form. Relevant studies may have been missed if they were behind paywalls, unpublished, not indexed in the searched platforms, or described using terms not captured by the search strings. Since the study used a critical narrative review design and employed a rapid review process, the final corpus should be understood as a focused, relevant body of literature rather than an exhaustive dataset.

RESULTS

Study Characteristics

The review included 15 studies published between 2023 and 2026. Most studies appeared in the latter part of the review period, with 10 studies published from 2025 to 2026 (67%), three in 2024 (20%), and two in 2023 (13%). No eligible practice-focused study from 2021 or 2022 was retained after applying the inclusion and exclusion criteria. This distribution suggests that research on climate change education practices has become more visible in recent years.

The final corpus consisted of 13 core practice studies (87%) and two support studies (13%). The core studies directly reported classroom practices, school-based environmental activities, learner participation, teacher readiness, or school–community implementation. The support studies provided conceptual and pedagogical grounding for environmental education, Education for Sustainable Development, and knowledge–behavior relationships in secondary education.

In terms of research design, nine studies used quantitative non-experimental designs (60%), including descriptive, correlational, comparative, and developmental approaches. Two studies used mixed-methods designs (13%), while two used qualitative or multi-phase qualitative approaches (13%). One study used an experimental design (7%), and one was a meta-analysis (7%). This design profile shows that the evidence base is dominated by descriptive and self-report studies, while intervention-based and synthesis-oriented studies remain limited.

The dominant participants or data sources also varied. Eight studies focused mainly on learners (53%), four on teachers, science teachers, school heads, or school personnel (27%), two on school-based programs or home–school–community practices (13%), and one synthesized previous studies through meta-analysis (7%). This pattern indicates that learner awareness, climate literacy, and reported practices remain the most common areas of inquiry, while fewer studies examine teacher enactment, whole-school implementation, or sustained community-linked practice.

The content focus of the studies reflected several entry points for climate change education. Six studies centered on learner climate literacy, global warming knowledge, adaptation practices, or disaster risk understanding (40%). Four studies focused on teacher readiness, science instruction, technology-supported teaching, or climate action integration (27%). Two studies examined school-based environmental programs and home–school–community linkages (13%). One study examined a pedagogical intervention for climate science awareness (7%), while two provided broader environmental education or Education for Sustainable Development framing (13%). Overall, the corpus shows that the field is organized around multiple entry points for practice, including classroom instruction, learner participation, teacher readiness, school programs, and community linkage.

Influence of Study Focus and Design on Findings

The focus and design of the included studies shaped the type of evidence generated. Learner-centered studies ($n = 8$, 53%) were the main source of evidence on awareness, attitudes, climate literacy, and the knowledge–action gap. These studies commonly measured what students knew, believed, or reported doing regarding climate change, global warming, adaptation, mitigation, and disaster preparedness. As a result, they were useful for identifying gaps between awareness and sustained practice.

Teacher-centered studies ($n = 4$, 27%) provided evidence on readiness and implementation constraints. These studies showed that teachers were generally willing to integrate climate-related topics but reported barriers related to training, materials, technology familiarity, curriculum support, leadership, and partnerships. This evidence helped explain why implementation may remain uneven even when teachers recognize the importance of climate change education.

School-based and community-linked studies contributed evidence on how climate change education is enacted through programs, organizations, routines, and

partnerships. These studies showed that YES-O activities, WASH-linked routines, school greening, waste segregation, recycling, tree planting, and community participation can support climate-related learning. However, they also indicated that school-based practices may not be sustained when weakly connected to home routines, barangay support, and community norms.

Research design also influenced the strength of claims that could be made. Quantitative non-experimental studies ($n = 9$, 60%) were useful for describing awareness, practices, readiness, and relationships among variables, but they provided limited evidence of actual classroom enactment. Mixed-methods and qualitative studies ($n = 4$, 26%) offered richer descriptions of school programs, teacher experiences, and implementation barriers. The single experimental study provided rare evidence on pedagogical intervention, while the meta-analysis offered broader support for context-based teaching. Overall, the corpus is useful for describing reported practices and recurring implementation issues, but it is less able to support strong claims about long-term effectiveness or causal impact.

Theme 1: Climate Change Education as Classroom Integration

This theme shows that climate change education is commonly implemented through classroom integration, especially in science and environmental education. Several studies reported content-based instruction, context-based instruction, collaborative learning, multimedia, experiments, project-based learning, curriculum integration, and climate action topics as common instructional entry points. Bernardino (2025) examined content-based, context-based, and collaborative instruction for climate science awareness among Grade 7 learners. Buyan and Villocido (2025) reported that science teachers integrated environmental education through project-based learning, multimedia, experiments, community involvement, clean-up drives, and tree planting. Romero (2025) showed that climate action and SDG 13 were integrated into science instruction, although teachers reported limited familiarity with the formal climate action framework. Corpuz and Quiambao (2026) further showed that secondary science teachers reported climate change education practices, but these were not yet fully aligned with stronger climate change education goals.

This theme indicates that climate change education in Philippine secondary schools is usually embedded in existing subjects rather than taught as a separate field. This arrangement makes implementation practical because teachers can connect climate concepts with existing science and environmental topics. However, the findings also suggest that classroom integration varies in depth. Some lessons appear to focus on awareness or general environmental responsibility, while fewer studies show strong evidence of instruction on mitigation, adaptation, vulnerability, disaster preparedness, and local climate risk. The pattern suggests that classroom integration is present, but it still needs clearer learning outcomes, stronger conceptual grounding, and more consistent links with student action.

Theme 2: School-Based Environmental Action as Climate Education Practice

The second theme shows that climate change education is enacted through school-based environmental action. The reviewed studies reported practices such as YES-O activities, tree planting, waste segregation, recycling, clean-up drives, school greening, water conservation, electricity conservation, environmental advocacy, monitoring, and school campaigns. Cadiz and Cortez (2024) identified effective YES-O practices such as personal advocacy, resource availability, participatory implementation, monitoring, capacity-building, and networking. Fulmaran (2024) reported learner practices such as saving electricity and water, waste segregation, tree planting, participation in environmental activities, waste reduction, and information sharing. Buyan and Villocido (2025) identified clean-up drives, tree planting, experiments, project-based learning, and community involvement as part of environmental education practice. Espinosa et al. (2026) also identified YES-O, WASH, school greening, recycling, tree planting, and waste segregation as school-based entry points for climate change education.

These findings show that environmental action is one of the most visible forms of climate change education in Philippine schools. Students do not only encounter climate-related topics through classroom discussion; they also participate in school programs and environmental routines. However, the studies also suggest that school-based activities may remain limited when they are treated as stand-alone events. Activities such as tree planting, recycling, and waste segregation become stronger climate change education practices when they are connected to climate science, adaptation, mitigation, public health, disaster preparedness, and community resilience. This theme, therefore, shows that school activities are important, but their educational value depends on how clearly they are linked with learning.

Theme 3: Learner Awareness and the Knowledge–Action Gap

The theme concerns the recurring gap between learner awareness and sustained climate-related action. Several studies found that students showed awareness, concern, positive attitudes, or willingness to participate in climate-related activities. However, the same studies also reported weak or uneven understanding of climate science, mitigation, adaptation, vulnerability, and disaster preparedness. Desabayla and Gueta (2023) found that senior high school students were generally aware of the effects of climate change, but their orientation toward mitigation was weaker. Fulmaran (2024) reported that students had positive knowledge, attitudes, and practices toward global warming, but knowledge was not significantly associated with practice. Alfonso et al. (2025) found that junior high school students expressed concern and willingness to join climate advocacy, yet their conceptual understanding was below the desired level. Balan et al. (2025) also found low climate science knowledge among senior high school students despite positive attitudes and competence. Vidal and Dela Cruz (2025) reported gaps in students' understanding of mitigation, adaptation, vulnerability, and disaster risk management.

This theme suggests that awareness alone is not enough. Learners may recognize climate change as a serious issue and may express positive attitudes toward

environmental action, but this does not always mean that they understand climate processes or can apply climate-related knowledge in decision-making. The findings show that climate change education should not only increase awareness. It should also help students connect scientific concepts with local risks, school practices, household routines, and community action. This theme is central to the review because it explains why climate change education should be examined through actual practices rather than awareness scores alone.

Theme 4: Teacher Readiness and Implementation Constraints

Teacher readiness is a key condition for climate change education. The teacher-related studies reported a willingness to teach climate-related topics, but also identified limitations in training, resources, technology use, curriculum support, school leadership, and external partnerships. Salingatag and Akut (2025) found that teachers with higher climate change awareness were more likely to integrate technology into instruction, but some teachers lacked familiarity with digital tools and required further professional development. Romero (2025) found that science teachers were willing to integrate climate action into instruction, but they had limited formal knowledge of SDG 13 and needed specialized training and materials. Buyan and Villocido (2025) reported only moderate integration of environmental education into science due to insufficient resources, limited teacher training, and unclear curriculum support. Corpuz and Quiambao (2026) found that public secondary science teachers reported engaging in climate change education practices, but these were constrained by limited training, resource constraints, weak collaboration with experts and non-governmental organizations, and inconsistent leadership support.

This theme shows that climate change education depends not only on teacher willingness. Teachers need content knowledge, pedagogical strategies, localized materials, digital tools, assessment support, and school-level backing. The results also suggest that teacher readiness should be treated as an implementation issue rather than only an individual capacity issue. When teachers lack training and materials, climate change education may remain limited to brief discussions, general environmental reminders, or occasional school activities. Stronger implementation requires sustained teacher support and clearer links between climate content, classroom pedagogy, and school-based action.

Theme 5: Home–School–Community Linkage as a Condition for Sustained Practice

Climate change education is strengthened when school practices are connected to home and community contexts. Espinosa et al. (2026) provided the clearest evidence for this theme by showing that school initiatives such as YES-O, WASH, school greening, recycling, tree planting, and waste segregation become more meaningful when reinforced by family routines, barangay participation, local government support, and community norms. Cadiz and Cortez (2024) also found that the implementation of YES-O required stronger networking, linkages, and partnerships. Norcio (2026) reported school adaptation practices such as recycling, waste segregation, and conservation, but also found weaker participation in campaigns and reforestation activities.

This theme indicates that school-based climate change education cannot be sustained by schools alone. Students may participate in environmental activities in school, but these behaviors may weaken when they are not supported at home or in the community. This is significant in the Philippine context because learners encounter climate risks in daily life, including typhoons, flooding, heat, water interruptions, coastal hazards, and waste-management problems. The findings show that home–school–community linkage is not only an extension activity. It is a condition that helps climate change education move from school participation to sustained practice.

DISCUSSION

The findings suggest that climate change education is best understood as a developing practice system. The reviewed studies show several active entry points, including classroom instruction, school-based environmental programs, learner participation, teacher-led initiatives, and home–school–community practices. However, entry points remain unevenly connected. This explains why climate change education is present but still limited in depth, continuity, and action orientation.

This pattern is consistent with recent evidence showing that climate education can improve knowledge but does not automatically lead to sustained action. Climate literacy gains are more likely to influence behavior when learning is connected to local experience, learner agency, self-efficacy, collective participation, and opportunities for action (Aeschbach et al., 2025; Chen et al., 2026; Kolenatý et al., 2022; Martin et al., 2025). Thus, the knowledge–action gap found across the reviewed studies should not be interpreted only as a learner limitation. It also reflects a design issue in climate change education. When instruction remains focused on factual content, students may know about climate change without developing the capacity to evaluate risks, make decisions, communicate solutions, and participate in collective responses.

Classroom integration remains an important starting point, especially through science, environmental education, disaster preparedness, and sustainability-related lessons. However, science-based coverage is insufficient when it is treated only as content delivery. Studies have shown that science education may improve climate literacy without producing a comparable effect on climate action (Aeschbach et al., 2025; Chen et al., 2026). For this reason, climate change education should connect scientific concepts with local risks, civic reasoning, ethical judgment, student decision-making, and community participation. Lessons become more meaningful when learners examine typhoons, flooding, extreme heat, coastal risks, food security, waste issues, and preparedness through scientific, social, and practical perspectives (Guimerà-Ballesta et al., 2026; Madden & Bershtein, 2025; UNESCO, 2024).

School-based environmental action also needs stronger conceptual linkage. Activities such as greening programs, recycling, waste segregation, tree planting, clean-up drives, conservation campaigns, YES-O activities, and WASH-related routines provide opportunities for participation. However, these activities become stronger climate

education practices when students understand their connection to mitigation, adaptation, ecosystem protection, disaster preparedness, public health, and community resilience. Whole-school approaches emphasize that climate education becomes more meaningful when curriculum, school operations, facilities, leadership, partnerships, and assessment are aligned (Hargis et al., 2021; Nusche et al., 2024; UNESCO & MECCE, 2024). Without this alignment, environmental activities may remain routine school events rather than learning experiences that build climate literacy and action competence.

Teacher readiness is another condition for stronger implementation. The reviewed studies show that teachers may be willing to integrate climate-related topics, but their practices are shaped by training, instructional materials, technology access, school leadership, assessment tools, and external partnerships. This means that readiness should be treated as a system-level concern rather than only as an individual teacher attribute. Recent studies also show that teacher training, resource availability, institutional support, and researcher–teacher collaboration influence the quality of climate education practice (de Rivas et al., 2025; Meekaew & Saenkum, 2025; Nusche et al., 2024; UNESCO, 2024). One-time seminars are unlikely to be enough. Teachers need sustained professional learning, localized materials, collaborative planning, and support for school-community climate action.

The synthesis also indicates that home–school–community linkage is necessary for continuity. Learners may practice conservation, recycling, or waste segregation in school, but these behaviors may weaken when they are not reinforced at home and in the community. Climate risks are experienced locally through flooding, heat, typhoons, water interruptions, waste concerns, and evacuation experiences. Climate change education becomes more relevant when students investigate these conditions, connect them with classroom concepts, and participate in family or community responses. Youth-centered and whole-school approaches similarly emphasize local relevance, participation, community engagement, and action-oriented learning (Hargis et al., 2021; UNESCO, 2022, 2024; UNESCO & MECCE, 2024).

Assessment should also move beyond factual recall. If climate change education aims to develop awareness, participation, preparedness, and action competence, assessment should include interpretation, communication, decision-making, reflection, and action planning. Recent work on climate literacy emphasizes evaluation, communication, normative judgment, socio-emotional learning, behavioral engagement, and action-oriented outcomes (Martin et al., 2025; Nusche et al., 2024; UNESCO, 2024). Suitable assessment tasks may include local risk analysis, reflective journals, climate communication outputs, school environmental audits, community presentations, household practice logs, and project portfolios.

The study reframes climate change education as a connected practice system rather than a set of separate lessons and activities. Classroom instruction provides conceptual grounding, school-based action provides direct participation, teacher readiness shapes implementation quality, assessment defines what learning is valued, and home–school–community linkage supports continuity. The main contribution of this

synthesis is the shift from asking whether climate change education is present to asking how well its practices are connected. Stronger implementation requires alignment among climate science, local risk, learner participation, teacher support, school action, community partnership, and assessment of action competence.

Conclusion

This study concludes that climate change education practices in Philippine secondary schools are evident through classroom instruction, school-based environmental activities, learner participation, teacher-led initiatives, and community-linked programs. However, these practices remain uneven because classroom lessons, school programs, teacher readiness, learner agency, and community participation are not always connected into a coherent practice system. The major finding is that climate change education is present, but its depth, continuity, and action orientation remain limited. Learners need opportunities to connect climate concepts with local risks, school experiences, community conditions, and practical action, while teachers need support through training, instructional materials, school leadership, and partnerships. The study contributes a practice-based synthesis showing that stronger climate change education requires alignment among classroom learning, school-based environmental action, learner agency, teacher readiness, and home–school–community participation.

Recommendations

Climate change education should be strengthened as an integrated, practice-based component of secondary education. Lessons should connect climate concepts with Science, disaster risk reduction, environmental education, and local experiences such as typhoons, flooding, extreme heat, waste issues, and school disruptions.

School environmental activities should be linked with clear learning outcomes. Tree planting, waste segregation, recycling, clean-up drives, and conservation campaigns should include preparation, guided participation, reflection, and assessment so that learners understand their connection to mitigation, adaptation, and community resilience.

Teacher support should focus on sustained professional development, localized instructional materials, and practical strategies for inquiry-based, project-based, and community-linked learning. Schools should also strengthen partnerships with families, barangays, local government units, disaster risk reduction offices, and environmental organizations to sustain climate-related practices beyond the classroom.

Assessment should measure not only factual knowledge but also application, participation, communication, reflection, and action planning. Future studies should examine actual classroom enactment, school-based implementation, learner outputs, and the effectiveness of localized climate change education programs.

Compliance with Ethical Standards

This study used published and publicly accessible literature. It did not involve direct human participants, surveys, interviews, classroom observations, or access to private records. Therefore, participant recruitment and informed consent were not required. Ethical standards in scholarly writing were still observed. All sources were properly cited, findings were represented accurately, and unsupported claims were avoided. The study also distinguished peer-reviewed studies from background materials, reports, and non-corpus sources.

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Corresponding author: rkaalindayu@bpsu.edu.ph