# FROM POLICY TO PRACTICE IN CLIMATE-RESPONSIVE EDUCATION: A STRUCTURAL EQUATION MODEL OF CURRICULUM SUPPORT AND INSTRUCTIONAL PLANNING

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*ABSTRACT*. This study looked at how instructional planning and curricular support affected basic education teachers' climate-responsive teaching methods at a few public junior high schools in Zamboanga City, Philippines. The study used a mixed-methods approach with a convergent parallel design and was based on Understanding by Design (UbD), Ecological Systems Theory (EST), and the Education for Sustainable Development (ESD) framework. A researcher-adapted questionnaire was used to collect quantitative data from 120 teachers, which was then analyzed using structural equation modeling (SEM). In contrast, focus groups and interviews were used to acquire qualitative data from 12 participants, which was then subjected to thematic analysis. The results showed that while instructional materials were comparatively scarce, curricular support (M = 3.75), instructional preparation (M = 3.90), and climate-responsive teaching techniques (M = 3.85) were scored well. Curriculum support had a considerable impact on instructional planning, and instructional planning was a major predictor of teaching practices, acting as a crucial mediating variable, according to SEM results. According to qualitative research, there are difficulties with resources and training, and curriculum support is frequently implicit. Overall, the findings point to the importance of improving institutional support and instructional planning for successful climate-responsive education.

***KEYWORDS***: *Instructional Planning, Ecological Systems Theory, Education for Sustainable Development, Teaching Practices, Climate-responsive Education.*

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## INTRODUCTION

Globally, the increasing impacts of climate change have been a significant problem, especially for emerging nations like the Philippines. The Philippines was listed as one of the world's most vulnerable nations to climate-related risks due to its regular exposure to typhoons, floods, droughts, and sea level rise (World Risk Report, 2022). Education was found to be a major factor in climate adaptation, resilience, and sustainability in response to these risks (UNESCO, 2017). In order to equip students to comprehend climate issues, adapt to environmental challenges,

and act responsibly within their communities, educational institutions—especially those at the basic education level—were in a crucial position.

Acknowledging this, the Department of Education (DepEd) implemented a number of regulations to incorporate disaster risk reduction and climate change education into K–12 curricula. Among them was DepEd Order No. 52, s. DepEd Order No. 21, s. and 2011 (Strengthening Environmental Education in Basic Education). 2019 (K–12 Basic Education Program Policy Guidelines). These guidelines highlighted the significance of integrating environmental and climate-related content into all subject areas and encouraging climate-responsive teaching methods, which are contextualized, flexible, and designed to give students the tools they need to deal with environmental and climate-related issues in their local communities.

Translating policy into classroom practice remained a major difficulty in spite of these strong legislative objectives. Despite the fact that climate change topics were ostensibly included in the curriculum, many teachers reported that they faced significant challenges in delivering instruction due to a lack of training, restricted access to pertinent or locally relevant teaching resources, and inadequate curriculum support systems (Espinosa & Caisip, 2023). Furthermore, it was clear that there were limitations in instructional planning when lesson plans did not closely correspond with contemporary climate issues, local contexts, or community vulnerabilities; this misalignment was made worse by strict lesson formats, dense curricula with little flexibility, and time constraints (Philstar.com, 2023). Additionally, research revealed that although teachers and students were frequently aware of climate issues, this awareness was not always accompanied by sufficient curriculum guidance to scaffold instructional planning that could meaningfully embed climate content (Espinosa & Caisip, 2023; material resource studies via PISA data among Filipino schools).

Curriculum support—that is, the frameworks, resources, leadership or policy direction, and institutional support that allowed educators to design lessons that were climate responsive—was a key concern. For instance, Ignacio, Gotangco, Gonzales, and Lee-Chua (2024) used a systems thinking e-learning program on climate change to investigate junior high school instructors. They discovered that teachers' comprehension of climate science increased when they were given organized information and instructional strategies through such modules. However, the study also showed that persistent instructional change was challenging in the absence of associated institutional support, such as continuous access to updated materials, administrative advice, and mechanisms to incorporate what they learned into actual lesson planning. Therefore, it seemed that curriculum support alone would not be enough to change instructional planning in climate education.

PISA 2018-based research on material resources, school atmosphere, and achievement disparities in the Philippines produced another pertinent discovery. According to that study, schools with less material resources—such as scientific labs, textbooks, and instructional materials—struggled with lower achievement in part because these resources were essential to what teachers could design and carry out in the classroom. Instructional planning suffered if there was insufficient curriculum support in the form of materials. Thus, even in cases where policy mandates were in place, instructors in underfunded schools were unable to create climate-aligned curriculum due to resource inequality (ScienceDirect, 2020).

Three major gaps were found in these works. First, there was little empirical modeling of how various aspects of curriculum support (such as policy guidance, materials, leadership support, and curriculum alignment) directly influenced instructional planning in climate-responsive education, despite the fact that numerous studies documented difficulties and explained what was lacking in

terms of curriculum support or instructional constraints. Second, there was a dearth of comparative research across educational levels. The majority of the literature was on basic education, with significantly fewer studies looking at higher education and the relationship between instructional design in climate education and curriculum support at that level. Third, the effectiveness of curriculum support in facilitating instructional planning was found to be influenced by local/contextual variability (geographical, socioeconomic, rural vs. urban); most studies did not adequately break down how these contextual factors moderated the relationship.

Therefore, the relationship between curricular support and instructional planning in the context of climate-responsive teaching throughout Philippine basic education settings was the main focus of this study. It specifically sought to ascertain which aspects of curriculum support had the greatest impact on instructional planning, how policy curricular mandates matched instructional plans, and how contextual factors might moderate these relationships using a Structural Equation Model (SEM). In order to help policymakers, curriculum developers, and educational leaders better target interventions and enhance coherence between curriculum support and instructional planning for climate-resilient learning, the study aimed to shed light on where support systems were succeeding or failing in putting climate policy into practice.

## LITERATURE

Global foundational agreements and frameworks that require countries to integrate education, awareness, and capacity development into their climate response efforts serve as the cornerstone of climate change education. A legal basis for educational interventions on climate concerns is established by the United Nations Framework Convention on Climate Change (UNFCCC, 1992), which mandates that parties encourage public engagement, understanding, and awareness of climate change. This duty was then reaffirmed by the Paris Agreement (2015), which specifically called on countries to improve public awareness, education, training, and communication about climate change as essential components of mitigation and adaptation plans (United Nations, 2015). The Philippines pledged to incorporate public awareness and climate literacy into its national climate strategy by ratifying the Paris Agreement (Republic of the Philippines, 2017).

Research from throughout the world shows how school systems apply climate education programs in the classroom, highlighting tactics and difficulties. Education for Sustainable Development (ESD) and climate change education are linked by Mochizuki and Bryan (2015), who promote systems thinking, participatory learning, and comprehensive curricular integration. In order to influence international standards for climate-responsive education, they stress that curriculum support should incorporate climate subjects and encourage inquiry, reflection, and local adaptation.

Long, White, and Henderson (2025) investigate how the implementation of climate change education is mediated by school district policies, administrative systems, and resource allocations in a meso-level study conducted in the United States. They discovered that the effectiveness of climate education is influenced by differences in district-level assistance, including curriculum frameworks, teacher manuals, and institutional structures, even in jurisdictions with robust climate mandates. Teachers were left to interpret and modify guidelines on their own when support was lacking or unclear, which resulted in uneven instructional preparation and execution. This meso-level insight emphasizes how the development of instructional planning is significantly influenced by institutional support at levels above the classroom.

Though comparatively few research specifically analyze the relationship between institutional support and instructional design, numerous studies in the Philippine setting look at how environmental and climate education have been included into curricula and instructional practices. Flores (2023) investigated the ways in which Caraga Region teacher education institutions promote awareness and integration of Education for Sustainable Development (ESD). Although awareness is growing, she discovered that poor connections between theory and classroom practice, uneven policies, and a lack of systematic support materials sometimes cause the institutionalization of ESD in teacher curriculum to stagnate. Her research demonstrates how teacher educators' course planning is shaped—and occasionally constrained—by institutional curricular support.

A framework for creating K–12 environmental education called "scientific context, reasoning, and pro-environmental behavior" is put out by Malaluan, Santos, and Cruz (2020). Their work, which emphasizes alignment of conceptual frameworks, inquiry-based pedagogy, and learner-centered practice, provides helpful benchmarks for instructional planning in climate education despite being mostly conceptual. According to their concept, well-supported curriculum design should anticipate, support, and evaluate students' environmental thinking.

More locally, Nibalvos, Pinarok, and Dala (2016) looked into how science-related courses at Eastern Samar State University's Borongan Campus incorporated climate change themes. According to their findings, even though curricula cover climate change, actual instructional planning is typically superficial. Teachers frequently treat climate topics as add-ons rather than integrated themes, partly because of a lack of supporting resources, strict syllabus requirements, and a lack of institutional mandates. This study demonstrates how inadequate curriculum support results in shallow instructional planning.

Santos, Cruz, and Dela Cruz (2022) looked at how DepEd projects, programs, and activities for mitigating climate change are implemented in schools at the K–12 basic education level. According to their research, there is a gap between project launch and regular inclusion in daily instruction, even when program execution is evaluated as "very high" in terms of awareness. Inadequate curriculum guidelines, a lack of locally relevant resources, and a lack of administrative oversight were mentioned by teachers as barriers to incorporating climate themes into lesson plans. According to local data, there are significant differences between schools in how institutional support is translated into instructional planning, even when it is there in theory.

Together, these national studies indicate that although environmental and climate education have been acknowledged and partially incorporated into Philippine educational frameworks, the influence of institutional support on how teachers or teacher educators plan lessons has not received enough attention from a structural modeling standpoint. Instead of examining how aspects of curriculum support influence instructional planning and practice, the majority of research uses descriptive or correlational methods.

## METHODS

### 1. Research Design

This study examined the effects of instructional planning and curriculum support on climate-responsive teaching practices using a convergent parallel mixed methods methodology. It collected qualitative insights through focus groups and interviews and used Structural Equation Modeling (SEM) for quantitative data analysis. It revealed important patterns and contextual realities in educational research that emphasize the significance of both numerical data and individual experiences.

**2. Research Locale**

This study examines climate-responsive education in Zamboanga City, Philippines, with an emphasis on the difficulties public junior high schools in both urban and rural locations confront as a result of hazards including landslides and flooding. Regardless of resource availability, it emphasizes how climate vulnerability affects education and disseminates findings while protecting participant confidentiality. The schools adhere to the K–12 Curriculum, which includes climate education, demonstrating how educators have adjusted to their environmental contexts in the face of changing educational regulations.

**3. Participants of the Study**

This study focused on Zamboanga City public junior high school teachers that teach science, Araling Panlipunan, and Edukasyon sa Pagpapakatao (ESP), which incorporates climate education. It included a qualitative phase where 12 teachers were interviewed about their knowledge of integrating climate education, and a quantitative phase where 120 instructors completed a survey on curriculum support and instructional planning. This sample size, which aims to gather insights on instructional methods and experiences connected to climate-responsive education, is in line with Creswell's (2013) guidelines for in-depth investigation.

**4. Sampling Procedure**

Purposive sampling was used in both the quantitative and qualitative phases of this study's mixed-method sample methodology. Based on Department of Education statistics on schools taking part in Disaster Risk Reduction and Management programs, 120 public junior high school teachers from Zamboanga City's climate-vulnerable areas were included in the quantitative phase. Twelve instructors who included climate-related issues in their classes were chosen for the qualitative phase using criterion sampling. This ensured that the teachers possessed the knowledge necessary to provide insightful comments for instructional planning and climate-responsive curricular assistance.

**5. Research Instrument**

The study collected quantitative and qualitative information on curricular support, instructional planning, and climate-responsive teaching among junior high school teachers in the Philippines using a semi-structured interview guide and a researcher-adapted questionnaire. A five-point Likert scale was used in the quantitative section to assess Curriculum Support, Instructional Planning, and Climate-Responsive Teaching; open-ended interviews centered on teachers' experiences with climate-responsive education were utilized in the qualitative section. In order to ensure credibility through data triangulation, informed consent was acquired and interviews were recorded for thematic analysis.

**6. Data Gathering Procedure**

With participant permission and Department of Education approval, the study used systematic data collection to guarantee reliable results. Standardized surveys were employed in the quantitative phase to gauge curriculum support and instructional strategies, which were then examined using structural equation modeling (SEM). Semi-structured interviews and focus groups

with chosen teachers were used in the qualitative phase to examine their teaching experiences. Data collection took place concurrently to combine narrative and numerical data. Creswell and Plano Clark's mixed methods approach was followed in the analysis, which used triangulation to strengthen the study's findings.

**7. Ethical Considerations**

This study complied with the American Educational Research Association's rules and rigorous ethical requirements for educational research. The Department of Education and the Research Ethics Committee granted prior approval for volunteer participation. Confidentiality and the right to withdraw were guaranteed by informed permission. Responses were anonymized, and the materials were safely kept. Participants gave their express consent for audio recording of interviews, and transcriptions were reviewed. To maintain academic integrity, the findings were presented objectively and with the appropriate citations.

## RESULTS

**1. What is the level of curriculum support perceived by basic education teachers in implementing climate-responsive education?**

*Table 1 Perceived Level of Curriculum Support in Implementing Climate-Responsive Education*

| Statement | Mean | Standard Deviation | Descriptive Interpretation |
|---|---|---|---|
| 1. My school provides instructional materials that support climate education. | 3.38 | 1.09 | Moderate |
| 2. The curriculum clearly includes environmental and climate change content. | 4.20 | 0.79 | High |
| 3. School administrators actively support teachers in integrating climate-responsive lessons. | 3.89 | 0.90 | High |
| 4. Our school's improvement plan (SIP) includes climate or environmental goals. | 3.79 | 0.92 | High |
| 5. I am encouraged by DepEd policies to incorporate sustainability in teaching. | 4.08 | 0.83 | High |
| 6. There are sufficient training programs offered for climate education. | 3.48 | 1.01 | High |
| 7. I have access to localized or contextualized resources for climate-related instruction. | 3.44 | 0.94 | High |
| 8. There is a support system among colleagues for sharing climate teaching strategies. | 3.76 | 0.99 | High |
| 9. The school provides time or opportunities (e.g., LAC sessions) for discussing climate instruction. | 3.60 | 1.06 | High |
| 10. The school environment (e.g., eco-friendly initiatives) reinforces climate education practices. | 3.87 | 0.94 | High |
| **Overall** | **3.75** | **0.98** | **High** |

*Legend: 5.00-4.21: Very High (Strongly Agree), 4.20-3.41: High (Agree), 3.40-2.61: Moderate (Neutral), 2.60-1:81: Low (Disagree), 1.80-1.00: Very Low (Strongly Disagree)*

Table 1 shows that educators are in favor of including environmental and climate-related subjects in the curriculum (M = 4.20, SD = 0.79). Additionally, they assess leadership support (M = 3.89, SD = 0.90) and policy encouragement (M = 4.08, SD = 0.83) favorably. Additionally, the school's improvement plan was rated favorably for its alignment with eco-friendly activities (M = 3.87, SD = 0.94) and climate goals (M = 3.79, SD = 0.92). The availability of climate education materials was moderate (M = 3.38, SD = 1.09) and training program responses varied (M = 3.48, SD = 1.01; M = 3.44, SD = 0.94), but instructional resources were evaluated lower.

**2. What is the extent of instructional planning practices that integrate climate change and sustainability concepts?**

*Table 2 Extent of Instructional Planning Practices*

| Statement | Mean | Standard Deviation | Descriptive Interpretation |
|---|---|---|---|
| 1. I intentionally integrate climate-related content into my daily or weekly lesson plans. | 3.81 | 0.70 | High |
| 2. My instructional planning includes real-life climate issues relevant to students' communities. | 3.91 | 0.67 | High |
| 3. I use locally available materials and examples to teach sustainability. | 4.01 | 0.73 | High |
| 4. I align my climate-integrated lessons with DepEd MELCs and learning competencies. | 3.95 | 0.85 | High |
| 5. I develop learning objectives that promote environmental awareness. | 3.89 | 0.78 | High |
| 6. I plan lessons that involve student-led inquiry into climate-related problems. | 3.88 | 0.74 | High |
| 7. I prepare differentiated activities for diverse learners to explore climate topics. | 3.83 | 0.87 | High |
| 8. I integrate environmental values and attitudes in my learning goals. | 4.16 | **0.67** | High |
| 9. I regularly review and update my lesson plans to include emerging climate issues. | 3.76 | 0.82 | High |
| 10. I incorporate community or place-based learning approaches in planning my climate lessons. | 3.83 | 0.83 | High |
| **Overall** | **3.90** | **0.77** | **High** |

*Legend: 5.00-4.21: Very High (Strongly Agree), 4.20-3.41: High (Agree), 3.40-2.61: Moderate (Neutral), 2.60-1:81: Low (Disagree), 1.80-1.00: Very Low (Strongly Disagree)*

Table 2 demonstrates that, with an overall mean score of 3.90 (SD = 0.77), public junior high school teachers have a favorable opinion of instructional preparation for climate education and sustainability. Integrating environmental values into learning objectives had the highest mean score (M = 4.16, SD = 0.67), followed by using local resources (M = 4.01, SD = 0.73) and aligning with DepEd MELCs (M = 3.95, SD = 0.85). Additionally, teachers valued student-led inquiry (M = 3.88, SD = 0.74) and real-world climate issues (M = 3.91, SD = 0.67). Reflective planning and community participation demonstrated a strong commitment to integrating climate education in lesson design, albeit having somewhat lower scores.

**3. What is the level of climate-responsive teaching practices among basic education teachers?**

*Table 3 Level Of Climate-Responsive Teaching Practices*

| Statement | Mean | Standard Deviation | Descriptive Interpretation |
|---|---|---|---|
| 1. I lead classroom discussions on climate change, environmental protection, and sustainability. | 4.00 | 0.72 | High |
| 2. I involve students in hands-on environmental projects (e.g., tree planting, recycling). | 3.84 | 0.92 | High |
| 3. I encourage students to apply problem-solving skills to real climate-related issues. | 3.98 | 0.79 | High |
| 4. I use multimedia and technology to teach about climate and environmental topics. | 4.08 | 0.74 | High |

| | | | |
|---|---|---|---|
| 5. I facilitate learning activities that emphasize conservation and responsible resource use. | 4.04 | 0.69 | High |
| 6. I assess students' understanding of climate issues using authentic tools (e.g., portfolios, performance tasks). | 3.83 | 0.76 | High |
| 7. I invite local experts or resource persons to speak about climate and disaster preparedness. | 3.08 | 1.03 | Moderate |
| 8. I encourage learners to share climate action ideas relevant to their community. | 3.92 | 0.73 | High |
| 9. I promote student participation in school-wide or community-based environmental campaigns. | 3.83 | 0.80 | High |
| 10. I foster critical thinking by examining multiple perspectives on climate-related topics. | 3.85 | 0.76 | High |
| **Overall** | **3.85** | **0.84** | **High** |

*Legend: 5.00-4.21: Very High (Strongly Agree), 4.20-3.41: High (Agree), 3.40-2.61: Moderate (Neutral), 2.60-1:81: Low (Disagree), 1.80-1.00: Very Low (Strongly Disagree)*

Table 3 shows that basic education instructors have a high degree of climate-responsive teaching techniques, with an overall mean of 3.85 (SD = 0.84). Leading conversations on climate-related topics (M = 4.00), organizing conservation activities (M = 4.04), and employing multimedia for climate education (M = 4.08) were important techniques. Additionally, teachers promoted critical thinking (M = 3.85) and problem-solving for climate-related concerns (M = 3.98). The practice of bringing in local experts for climate talks, on the other hand, had the lowest mean (M = 3.08), suggesting less regular cooperation with outside stakeholders.

**4. Does curriculum support significantly predict the instructional planning in the climate - response education?**

*Table 4 Coefficient of Determination and Effect Size of Curriculum Support on Instructional Planning*

| Path Analysis | $R^2$ | $R^2$ adjusted | $f^2$ | Interpretation |
|---|---|---|---|---|
| **CS □ IP** | **0.543** | **0.539** | **1.189** | Curriculum support has a strong and meaningful influence on instructional planning in climate-responsive education. |

Table 4 shows that, according to Hair et al. (2021), Curriculum Support (CS) has excellent explanatory power, accounting for 54.3% of the variance in Instructional Planning (IP) with a $R^2$ value of 0.543 and an adjusted $R^2$ of 0.539. The effect size (f2 = 1.189) indicates that curriculum assistance has a significant impact on instructional planning techniques. As a result, the null hypothesis—that instructional planning is not significantly predicted by curriculum support—is rejected.

**5. Does instructional planning significantly predict the climate-responsive teaching practices?**

*Table 5 Coefficient of Determination and Effect Size of Instructional Planning on Climate-Responsive Teaching Practices*

| Path Analysis | $R^2$ | $R^2$ adjusted | $f^2$ | Interpretation |
|---|---|---|---|---|
| **IP □ CRTP** | **0.681** | **0.676** | **0.394** | Instructional planning has a strong and meaningful influence on the implementation of climate-responsive teaching practices |

Table 5 ishows that, with an R2 value of 0.681, Instructional Planning (IP) accounts for roughly 68.1% of the variance in Climate-Responsive Teaching Practices (CRTP). The significant impact of instructional planning on CRTP is demonstrated by the substantial effect size ($f^2 = 0.394$). As a

result, the null hypothesis—that CRTP is not significantly predicted by instructional planning—is rejected.

**6. Does curriculum support significantly predict the climate-responsive teaching practices?**

*Table 6 Coefficient of Determination and Effect Size of Curriculum Support on Climate-Responsive Teaching Practices*

| Path Analysis | $R^2$ | $R^2$ adjusted | $f^2$ | Interpretation |
|---|---|---|---|---|
| **CS → CRTP** | **0.681** | **0.676** | **0.185** | Curriculum support has a significant and meaningful influence on climate-responsive teaching practices. |

Table 6 demonstrates that, with an R2 value of 0.681 and an adjusted R2 of 0.676, Curriculum Support (CS) explains roughly 68.1% of the variance in Climate-Responsive Teaching Practices (CRTP). The null hypothesis is rejected because the effect size (f2 = 0.185) shows a moderate effect, indicating that curriculum support considerably influences the implementation of climate-responsive teaching practices.

**7. Does instructional planning significantly mediate the relationship between curriculum support and climate-responsive teaching practices?**

*Table 7 Specific Indirect Effects*

| Path analysis | Path coefficient | t value | p value | Hypothesis |
|---|---|---|---|---|
| **CS → IP → CRTP** | 0.386 | 5.687 | 0.000 | Valid |

**significant at p<0.05*

Table 7 demonstrates that, with a path coefficient of 0.386, t-value of 5.687, and p-value of 0.000, instructional planning significantly mediates the relationship between curriculum support and climate-responsive teaching practices, rejecting the null hypothesis that it does not.

## DISCUSSION

*1.) What is the level of curriculum support perceived by basic education teachers in implementing climate-responsive education?*

According to the study, instructors strongly agree that climate-responsive education is essential, and their consistent opinions are reflected in the low standard deviation. This is in favor of national initiatives that integrate climate education into the K–12 curriculum, like RA 9729. The integration of climate education is highlighted by the findings, which are connected to Bronfenbrenner's Ecological Systems Theory and demonstrate the importance of school leadership and policy direction. In order to implement climate policies in the classroom, administrative support is essential. Accessible teaching resources and regular professional development are severely lacking, notwithstanding current eco-friendly activities and compliance with the Education for Sustainable Development (ESD) framework. Although teachers recognize institutional support for climate education, successful implementation is hampered by a lack of resources and training. The findings urge more research on curriculum support as a crucial element in the advancement of climate-responsive education.

*2.) What is the extent of instructional planning practices that integrate climate change and sustainability concepts?*

The results demonstrate that instructors generally implement instructional planning for climate change education well, especially when it comes to contextualization, values integration, and curricular standard alignment. These methods align with global research that supports

inquiry-based and participatory approaches to climate education (Bhuiyan & Sajia, 2024; Hariyono & Susantini, 2023). Although the degree of implementation varies per school, local research also shows that teachers incorporate environmental and community settings into climate-related courses (Nibalvos, Pinarok, & Dala, 2016). This bolsters national research highlighting the significance of inclusive and methodical instructional design in environmental and climate education (Perez & Bua, 2022; Malaluan et al., 2020).However, due to obstacles including time constraints, poor training, and insufficient institutional support, the results also show variations in place-based approaches and reflective lesson updates (Muccione, Ewen, & Vaghefi, 2023; Santos, Cruz, & Dela Cruz, 2022). According to earlier research, professional development opportunities and institutional support have a significant impact on the quality of instructional planning (Flores, 2023; Long, White, & Henderson, 2025). Overall, the findings show that teachers in Zamboanga City successfully incorporate climate education objectives into their lesson plans, but they also emphasize the necessity of bolstering professional development, reflective planning, and community involvement in order to maintain and enhance climate-responsive teaching.

*3.) What is the level of climate-responsive teaching practices among basic education teachers?*

The results show that basic education teachers use climate-responsive teaching practices at a high level. They frequently use learner-centered activities, technology-supported learning, interactive discussions, and values-oriented approaches to encourage environmental responsibility and climate awareness. These methods align with research demonstrating the efficacy of action-oriented and participatory approaches to climate education (Mochizuki & Bryan, 2015; Bhuiyan & Sajia, 2024). The findings also corroborate research supporting problem-based, reflective, and experiential learning in enhancing environmental literacy, as well as the Education for Sustainable Development framework, which prioritizes critical thinking, participatory learning, and sustainability-focused education (Malaluan, Santos, & Cruz, 2020; Perez & Bua, 2022; Hariyono & Susantini, 2023; Santos, Cruz, & Dela Cruz, 2022).However, due to constraints in relationships, institutional support, and logistics, there are still inconsistent practices that call for community involvement and external collaboration (Nibalvos, Pinarok, & Dala, 2016; Santos et al., 2022). This is consistent with research showing that partnerships for sustainable climate education rely significantly on institutional support and available resources (Muccione, Ewen, & Vaghefi, 2023; Long, White, & Henderson, 2025). Overall, the results show that educators in Zamboanga City actively incorporate climate education into their lesson plans while emphasizing the necessity of bolstering institutional support and school-community ties to further improve climate-responsive instruction.

*4.) Does curriculum support significantly predict the instructional planning in the climate - response education?*

The results show that teachers' instructional planning in climate-responsive education is significantly predicted by curriculum support. Teachers' capacity to design structured, learner-centered lessons that integrate sustainability and climate change is improved by adequate support and resources. Teachers feel more confident when they use inclusive tactics and align objectives in supportive learning environments. The results are in line with Understanding by Design, which highlights the significance of coherent curricular frameworks in effective instructional planning, and Ecological Systems Theory, which explains how environmental and institutional systems shape instructional practices. As a result, school administrators and education authorities play a

critical role in improving curriculum policies, resources, training, and collaborative practices to improve instructional quality.The important role that curricular support plays in enhancing climate-responsive instruction is also supported by empirical research (Mochizuki & Bryan, 2015; Flores, 2023; Perez & Bua, 2022). Overall, the results show that strong institutional and curricular support that improves teachers' instructional planning techniques is the first step toward effective climate-responsive education.

*5.) Does instructional planning significantly predict the climate-responsive teaching practices?*

The results show a significant impact size and suggest that instructional preparation is a critical predictor of teachers' climate-responsive teaching methods. Teachers that incorporate inquiry-based and experiential learning activities and methodically match learning objectives with climate goals are more successful in raising awareness of climate change. Good instructional planning highlights the need to develop these abilities for consistent climate-responsive instruction by improving instructors' readiness for discussions and evaluations. The findings emphasize the significance of intentional instructional design and are consistent with frameworks such as Understanding by Design and Education for Sustainable Development.Overall, the results highlight the crucial role of instructional planning as a central mechanism through which climate education goals are translated into meaningful classroom practices, reinforcing its role within the study's structural model linking institutional support and climate-responsive teaching. Empirical studies also confirm that effective instructional planning is essential in climate and sustainability education, particularly in improving learner engagement and higher-order thinking (Mochizuki & Bryan, 2015; Bhuiyan & Sajia, 2024; Perez & Bua, 2022).

*6.) Does curriculum support significantly predict the climate-responsive teaching practices?*

The results show that curriculum assistance greatly improves teachers' climate-responsive activities, encouraging sustainability and climate awareness in the classroom. The need for better curriculum policies, leadership support, and resources is highlighted by the fact that meaningful climate debates and cross-subject integration are fostered by adequate institutional backing. This is consistent with Ecological Systems Theory, which highlights how institutional and environmental factors influence instructional strategies. The findings are consistent with research highlighting the importance of organizational support and curriculum frameworks in fostering climate-responsive pedagogy (Mochizuki & Bryan, 2015; Flores, 2023; Long, White, & Henderson, 2025). Overall, the study shows that strong and reliable institutional support systems are just as important for effective climate-responsive education as individual teacher initiatives. The results bolster the study's structural model and highlight the critical role that curriculum support plays in influencing instructional planning and climate-responsive teaching strategies..

*7.) Does instructional planning significantly predict the climate-responsive teaching practices?*

The analysis shows that the association between curriculum support and climate-responsive teaching practices is mediated by instructional preparation. Teachers' instructional planning is strengthened by improved curricular support, which enables the successful integration of climate change themes into lessons through clear guidelines, leadership support, materials access, and professional development. These results support Understanding by Design, emphasizing systematic instructional planning for meaningful learning outcomes. This partial

mediation suggests that enhancing climate-responsive teaching requires not only adequate curriculum resources but also targeted training and cooperative planning to improve teachers' instructional skills. Effective climate-responsive and sustainability-focused teaching methods also depend on curriculum support and instructional planning, according to studies by Mochizuki and Bryan (2015) and Flores (2023).

## CONCLUSION

For climate-responsive education, curriculum support is essential, but it is useless without sufficient teaching resources and methods. Teachers employ inquiry-based and participatory strategies to plan climate-focused curricula with great expertise and initiative. Teachers' ability to plan is improved by institutional assistance, demonstrating the importance of policy guidance for successful instruction. Planning has a strategic role in mediating the translation of curriculum support into instructional practices. However, without resources, continual development, and encouraging leadership, teacher competency is insufficient on its own. The interaction of contextual elements, instructional preparation, and policy support results in effective climate-responsive education, underscoring the necessity of coordinated institutional support to match classroom practices with policy.

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