

# Strategies On Climate Literacy And Disaster Education Among Junior High Schools In Congressional District I, SDO Batangas Province

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## Abstract

This study examined the strategies on climate literacy and disaster education among Junior High School students in Congressional District I, Schools Division of Batangas Province. It specifically aimed to determine the current level of students' climate literacy in terms of knowledge, attitudes, and practices; assess the extent of utilization of strategies in promoting climate literacy and disaster education; identify the challenges encountered in implementation; test the significant relationship between students' climate literacy and the extent of strategy utilization; and propose strategic activities based on the findings of the study.

The study employed a quantitative research approach using a descriptive-correlational research design, with semi-structured interviews utilized to support and validate the quantitative results. The respondents were 121 Araling Panlipunan teachers from public Junior High Schools in Congressional District I, Schools Division of Batangas Province, selected through stratified random sampling from a total population of 175 teachers. Data were gathered through a researcher-made questionnaire and were statistically treated using ranking, weighted mean, composite mean, and Pearson r correlation.

Findings revealed that the students' level of climate literacy was moderately aware in terms of knowledge (CM=3.36), attitudes (CM=3.37), and practices (CM=3.17). Likewise, instructional strategies (CM=3.59), school-based practices, and community engagement strategies were found to be highly utilized, while technology-based strategies were moderately utilized. The study further revealed a highly significant relationship between students' climate literacy and the extent of strategy utilization, with p-value of 0.000. Moreover, the major challenges identified included limited instructional time, inadequate learning materials, and limited family and community involvement, with an overall composite mean of 2.97.

Based on the findings, the study concluded that the effective utilization of climate literacy and disaster education strategies significantly contributes to the enhancement of students'



awareness and preparedness. It is therefore recommended that schools strengthen curriculum integration, provide adequate instructional resources, intensify teacher capability-building, and sustain collaborative partnerships among schools, families, and communities.

**Keywords:** *climate literacy, disaster education, strategies, challenges*

## Introduction

Climate change is one of the most urgent global challenges, bringing rising temperatures, stronger typhoons, sea-level rise, and other extreme weather events that threaten ecosystems, economies, and human life. The Philippines is highly vulnerable due to its geographic location along the Pacific Ring of Fire and typhoon belt, making it prone to frequent natural hazards. This situation underscores the need to strengthen climate literacy and disaster education among learners to equip them with the knowledge, skills, and values necessary for effective response and adaptation.

Climate literacy and disaster education are essential in developing students' understanding of environmental issues and in fostering responsible action toward sustainability and safety. In the Philippine educational system, Climate Change Education (CCE) and Disaster Risk Reduction and Management (DRRM) are integrated into the K–12 curriculum, particularly in Araling Panlipunan, to promote awareness, preparedness, and civic responsibility (DepEd, 2022). These efforts are supported by national policies such as the Climate Change Act of 2009 (Republic Act No. 9729) and the Philippine Disaster Risk Reduction and Management Act of 2010 (Republic Act No. 10121), which mandate the integration of climate and disaster education in schools. In addition, initiatives like the DepEd–WWF Climate Education program provide instructional resources and strategies to strengthen implementation in classrooms (WWF Philippines, 2021).

Despite these initiatives, the effectiveness of climate literacy and disaster education at the school level still needs further examination, particularly in local contexts such as Congressional District I, SDO Batangas Province, where learners are highly exposed to environmental risks. This study aimed to identify and assess the strategies used in promoting climate literacy and disaster education among Junior High School students, focusing on their knowledge, attitudes, and practices. Specifically, it examined the extent of utilization of instructional strategies and determined its relationship with students' level of climate literacy in terms of knowledge, attitudes, and practices.

## Research Questions

Specifically, this study sought to answer the following questions:

1. How may the teachers assess the current level of awareness on climate literacy of students in terms of:
  - 1.1. knowledge;
  - 1.2. attitudes; and
  - 1.3. practices?
2. What is the extent of utilization of the different strategies in promoting climate literacy and disaster education among the students with reference to:
  - 2.1. instructional strategies;
  - 2.2. disaster preparedness strategies;
  - 2.3. school-based practices;
  - 2.4. technology-based strategies; and
  - 2.5. community engagement strategies

3. Is there a significant relationship in the current level of climate literacy of Junior High School students and the extent of utilization of strategies in promoting climate literacy and disaster education?
4. What challenges do students and teachers encounter in the implementation of climate literacy and disaster education programs?
5. Based on the findings, what strategic activities may be proposed?

## **Methodology**

### **Research Design**

This study utilized a quantitative method through a descriptive-correlational research design to determine the significant relationship between students' climate literacy and the utilization of strategies in promoting climate literacy and disaster education. It also assessed the current level of climate literacy, the extent of strategy utilization, and the challenges encountered in implementation.

### **Participants**

The respondents of the study were 121 Araling Panlipunan teachers from public Junior High Schools in Congressional District I, SDO Batangas Province, drawn from a total population of 175 teachers. They were selected through stratified random sampling to ensure adequate representation across schools within the district. Selected teachers were also consulted during data collection for qualitative validation.

### **Research Instrument**

A researcher-made **structured questionnaire** was developed and validated by experts in the field of education and research methodology to ensure its content validity and appropriateness. The instrument measured:

- Level of students' climate literacy in terms of knowledge, attitudes, and practices
- Extent of utilization of strategies in promoting climate literacy and disaster education
- Challenges encountered in the implementation of climate literacy and disaster education programs

A combination of **Likert-scale**, and **open-ended** questions was used to gather both quantitative and qualitative data, allowing for a more comprehensive analysis of the respondents' perceptions and experiences.

## Data Collection Procedure

Data were gathered after securing permission from the concerned authorities and school administrators. The researcher administered the validated questionnaires to the selected respondents and ensured proper retrieval of accomplished instruments for analysis.

## Data Analysis

Descriptive statistics such as frequency, percentage, weighted mean, and standard deviation were used to summarize the data. **Pearson r correlation** was employed to determine the significant relationship between students' climate literacy and the extent of utilization of strategies in promoting climate literacy and disaster education.

## Results

### Section 1: Level of Climate Literacy of Students

**Table 2**  
**Current level of awareness on climate literacy of students in terms of Knowledge**

| The students can                                                                                 | Weighted Mean | Verbal Interpretation   | Rank |
|--------------------------------------------------------------------------------------------------|---------------|-------------------------|------|
| 1. Understand the causes of climate change, including human activities and natural processes     | 3.45          | Moderately Aware        | 2.5  |
| 2. Recognize the effects of burning fossil fuels on global warming                               | 3.35          | Moderately Aware        | 6    |
| 3. Identify factors such as deforestation and improper waste disposal that worsen climate change | 3.45          | Moderately Aware        | 2.5  |
| 4. Acknowledge the impacts of climate change, including rising sea levels and stronger typhoons  | 3.32          | Moderately Aware        | 7.5  |
| 5. Detect signs of climate change, such as higher temperatures and frequent flooding             | 3.32          | Moderately Aware        | 7.5  |
| 6. Recognize that human activities contribute significantly to climate change                    | 3.52          | Highly Aware            | 1    |
| 7. Explain the role of melting ice caps in the rise of global sea levels                         | 3.15          | Moderately Aware        | 10   |
| 8. Comprehend how climate change affects agriculture, fishing, and local food supply             | 3.39          | Moderately Aware        | 5    |
| 9. Rationalize the relationship between the greenhouse effect and global warming                 | 3.26          | Moderately Aware        | 9    |
| 10. Identify the vulnerability of the Philippines to climate-related disasters                   | 3.41          | Moderately Aware        | 4    |
| <b>Composite Mean</b>                                                                            | <b>3.36</b>   | <b>Moderately Aware</b> |      |

*Legend: Highly Aware (3.50 – 4.00), Moderately Aware (2.50 – 3.49), Slightly Aware (1.50 – 2.49), Least Aware (1.00 – 1.49)*

Table 2 shows that students' climate literacy in terms of knowledge is Moderately Aware, with a composite mean of 3.36, indicating a general understanding of climate change concepts such as causes, effects, and human contributions, but with limited depth in scientific understanding. The highest-rated indicator was recognizing that human activities contribute significantly to climate change (WM = 3.52, Highly Aware), while other indicators such as identifying environmental causes and the Philippines' vulnerability ranged from 3.32 to 3.45 (Moderately Aware), reflecting basic but incomplete understanding. The lowest mean was on explaining complex processes like melting ice caps and rising sea levels (WM = 3.15), suggesting difficulty in grasping scientific mechanisms that require deeper and more contextualized instruction. Overall, the findings imply that students have moderate knowledge of climate literacy, but deeper scientific understanding still needs strengthening through improved instructional strategies (UNESCO, 2022).

**Table 3**  
**Current level of awareness on climate literacy of students in terms of Attitude**

| The students can                                                                             | Weighted Mean | Verbal Interpretation   | Rank |
|----------------------------------------------------------------------------------------------|---------------|-------------------------|------|
| 1. Show concern about the effects of climate change on their community                       | 3.45          | Moderately Aware        | 3    |
| 2. Believe that everyone has a responsibility to protect the environment                     | 3.57          | Highly Aware            | 1    |
| 3. Follow environmental laws to reduce the impact of climate change                          | 3.31          | Moderately Aware        | 7    |
| 4. Value energy conservation as a way to address climate change                              | 3.37          | Moderately Aware        | 4    |
| 5. Participate in tree planting and reforestation to protect the environment                 | 3.24          | Moderately Aware        | 9.5  |
| 6. Perceive that schools and government agencies are taking action to address climate change | 3.24          | Moderately Aware        | 9.5  |
| 7. Recognize the importance of public awareness about climate change                         | 3.36          | Moderately Aware        | 5.5  |
| 8. Follow disaster management plans as essential in every school                             | 3.36          | Moderately Aware        | 5.5  |
| 9. Integrate climate education into various subjects                                         | 3.29          | Moderately Aware        | 8    |
| 10. Recognize that small actions can make a big difference in protecting the environment     | 3.46          | Moderately Aware        | 2    |
| <b>Composite Mean</b>                                                                        | <b>3.37</b>   | <b>Moderately Aware</b> |      |

*Legend: Highly Aware (3.50 – 4.00), Moderately Aware (2.50 – 3.49), Slightly Aware (1.50 – 2.49), Least Aware (1.00 – 1.49)*



Table 3 presents that students' climate literacy in terms of attitudes is Moderately Aware, with a composite mean of 3.37, indicating generally positive environmental attitudes but limited consistency in active participation. The highest-rated indicator was the belief that everyone is responsible for protecting the environment (WM = 3.57, Highly Aware), reflecting strong awareness of shared responsibility, while most indicators such as concern for climate change, energy conservation, and disaster preparedness ranged from 3.24 to 3.46 (Moderately Aware), showing awareness that is not always translated into action. The lowest ratings were on participation in tree planting and perception of institutional efforts (WM = 3.24), suggesting limited exposure to hands-on environmental programs and activities. Overall, the findings imply that students' positive attitudes need to be strengthened through more active involvement in environmental and climate-related initiatives (UNICEF, 2023).

**Table 4**  
**Current level of awareness on climate literacy of students in terms of Practices**

| The students can                                                                                 | Weighted Mean | Verbal Interpretation   | Rank |
|--------------------------------------------------------------------------------------------------|---------------|-------------------------|------|
| 1. Practice proper waste segregation and disposal at home and in school                          | 2.98          | Moderately Aware        | 10   |
| 2. Conserve water and electricity to help the environment                                        | 3.21          | Moderately Aware        | 4    |
| 3. Participate actively in tree-planting activities and environmental clean-up drives            | 3.12          | Moderately Aware        | 7.5  |
| 4. Share knowledge about climate change with classmates or family                                | 3.07          | Moderately Aware        | 9    |
| 5. Clean and maintain the surroundings to prevent flooding                                       | 3.13          | Moderately Aware        | 5.5  |
| 6. Reuse or recycle materials to reduce waste                                                    | 3.12          | Moderately Aware        | 7.5  |
| 7. Follow safety procedures during disaster drills                                               | 3.38          | Moderately Aware        | 1    |
| 8. Support school projects that promote climate and disaster awareness                           | 3.31          | Moderately Aware        | 2    |
| 9. Avoid harmful environmental practices, such as burning trash or using non-recyclable plastics | 3.13          | Moderately Aware        | 5.5  |
| 10. Participate actively in community or school campaigns on disaster preparedness               | 3.24          | Moderately Aware        | 3    |
| <b>Composite Mean</b>                                                                            | <b>3.17</b>   | <b>Moderately Aware</b> |      |

*Legend: Highly Aware (3.50 – 4.00), Moderately Aware (2.50 – 3.49), Slightly Aware (1.50 – 2.49), Least Aware (1.00 – 1.49)*

Table 4 illustrates that students' climate literacy in terms of practices is Moderately Aware, with a composite mean of 3.17, indicating that learners sometimes apply environmentally

responsible behaviors and disaster preparedness activities, but these are not consistently practiced in daily life. The highest-rated indicator was following safety procedures during disaster drills (WM = 3.38), reflecting strong familiarity with school-based preparedness activities, while other indicators such as supporting school climate projects (WM = 3.31) and participating in campaigns (WM = 3.24) also suggest willingness to engage when guided by the school. In contrast, the lowest mean was on practicing proper waste segregation and disposal (WM = 2.98), followed by sharing climate-related knowledge with others (WM = 3.07), indicating weak application of environmental practices outside structured school activities. Overall, the findings imply that while students are aware of appropriate climate and disaster-related actions, their actual practices remain inconsistent and need further reinforcement through continuous school and community-based engagement (UNESCO, 2022; IPCC, 2023).

## Section 2: Extent of Utilization of Strategies

**Table 5**  
**Extent of Utilization of the Different Strategies in Promoting Climate Literacy and Disaster Education in terms of Instructional Strategies**

| The teacher                                                                                                                                                            | Weighted Mean | Verbal Interpretation  | Rank |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------|------|
| 1. Applies experiential learning activities, such as simulations, role-playing, or hands-on exercises, to teach climate literacy and disaster preparedness.            | 3.62          | Highly Utilized        | 1.5  |
| 2. Encourages students to formulate questions, investigate, and reflect on climate change and disaster-related phenomena.                                              | 3.56          | Highly Utilized        | 4.5  |
| 3. Guides students to construct knowledge through collaborative exploration, discussion, and problem-solving activities.                                               | 3.62          | Highly Utilized        | 1.5  |
| 4. Emphasizes real-world applications of climate literacy and disaster preparedness concepts in students' daily lives.                                                 | 3.57          | Highly Utilized        | 3    |
| 5. Facilitates reflective and critical thinking activities, such as analyzing case studies or evaluating local disaster management practices, to deepen understanding. | 3.56          | Highly Utilized        | 4.5  |
| <b>Composite Mean</b>                                                                                                                                                  | <b>3.59</b>   | <b>Highly Utilized</b> |      |

*Legend: Highly Utilized (3.50 – 4.00), Moderately Utilized (2.50 – 3.49), Slightly Utilized (1.50 – 2.49), Least Utilized (1.00 – 1.49)*

Table 5 depicts the extent of utilization of instructional strategies in promoting climate literacy and disaster education is Highly Utilized, with a composite mean of 3.59, indicating that teachers frequently employ learner-centered and interactive approaches to make climate and disaster education more meaningful and relevant to students' experiences. The highest-rated



strategies (WM = 3.62) involve experiential learning such as simulations, role-playing, hands-on activities, and collaborative exploration, showing strong use of active and participatory teaching methods. Indicators on encouraging inquiry, critical thinking, and reflective activities also obtained high means (WM = 3.56), reflecting consistent promotion of analysis and problem-solving in environmental issues, while emphasizing real-world applications (WM = 3.57) further demonstrates the integration of lessons with actual community and disaster experiences. Overall, the findings imply that teachers actively use experiential, collaborative, inquiry-based, and contextualized strategies in teaching climate literacy and disaster education, making instruction more engaging and applied in real-life situations (UNESCO, 2022).

**Table 6**  
**Extent of Utilization of the Different Strategies in Promoting Climate Literacy and Disaster Education in terms of Disaster Preparedness Strategies**

| The school, teachers, and stakeholders                                                                | Weighted Mean | Verbal Interpretation      | Rank |
|-------------------------------------------------------------------------------------------------------|---------------|----------------------------|------|
| 1. Conduct regular disaster drills and simulations (e.g., earthquake, typhoon, fire)                  | 3.51          | Highly Utilized            | 2    |
| 2. Train students on emergency response procedures and first-aid practices                            | 3.35          | Moderately Utilized        | 5    |
| 3. Use hazard maps and disaster scenario exercises to enhance students' preparedness knowledge        | 3.48          | Moderately Utilized        | 4    |
| 4. Provide guidance on personal and household disaster preparedness plans                             | 3.50          | Highly Utilized            | 3    |
| 5. Organize drills and preparedness activities in coordination with local disaster management offices | 3.59          | Highly Utilized            | 1    |
| <b>Composite Mean</b>                                                                                 | <b>3.49</b>   | <b>Moderately Utilized</b> |      |

*Legend: Highly Utilized (3.50 – 4.00), Moderately Utilized (2.50 – 3.49), Slightly Utilized (1.50 – 2.49), Least Utilized (1.00 – 1.49)*

Table 6 shows that the extent of utilization of disaster preparedness strategies in promoting climate literacy and disaster education is Moderately Utilized, with a composite mean of 3.49, indicating that these activities are implemented in schools but not consistently across all areas. The highest-rated indicator was organizing drills and preparedness activities in coordination with local disaster management offices (WM = 3.59, Highly Utilized), showing strong collaboration with external agencies to support student readiness. Regular disaster drills and simulations also obtained a high mean (WM = 3.51), reflecting frequent practice of earthquake, fire, and typhoon response activities, while providing guidance on household preparedness and using hazard maps were moderately implemented (WM = 3.50–3.48), suggesting partial integration into instruction. The lowest mean was on training students in emergency response and first-aid practices (WM = 3.35), indicating limited exposure to hands-on emergency skills. Overall, the findings imply that while schools actively conduct drills and coordinate with stakeholders, other preparedness strategies still need strengthening and more consistent implementation to fully develop students' disaster readiness (UNESCO, 2022).

Table 7 shows that the extent of utilization of school-based practices in promoting climate literacy and disaster education is Highly Utilized, with a composite mean of 3.58, indicating that the school actively implements programs that promote environmental awareness, sustainability, and disaster preparedness among students. The highest-rated indicator was encouraging student participation in advocacy campaigns on climate and disaster issues (WM = 3.64), reflecting strong student engagement in awareness-building activities, while establishing climate or disaster clubs (WM = 3.59) and promoting recycling, tree planting, and sustainability initiatives (WM = 3.58) also show consistent integration of environmental practices into school programs.

**Table 7**  
**Extent of Utilization of the Different Strategies in Promoting Climate Literacy and Disaster Education in terms of School-Based Practices**

| The school                                                                                            | Weighted Mean | Verbal Interpretation  | Rank |
|-------------------------------------------------------------------------------------------------------|---------------|------------------------|------|
| 1. Implements environmental and climate-related student projects within the school.                   | 3.55          | Highly Utilized        | 4    |
| 2. Encourages student participation in school advocacy campaigns on climate and disaster issues.      | 3.64          | Highly Utilized        | 1    |
| 3. Promotes recycling, tree planting, and other sustainability activities as part of school programs. | 3.58          | Highly Utilized        | 3    |
| 4. Establishes climate or disaster clubs to engage students in ongoing school activities.             | 3.59          | Highly Utilized        | 2    |
| 5. Monitors and evaluates the outcomes of school-based climate literacy and disaster initiatives.     | 3.54          | Highly Utilized        | 5    |
| <b>Composite Mean</b>                                                                                 | <b>3.58</b>   | <b>Highly Utilized</b> |      |

*Legend: Highly Utilized (3.50 – 4.00), Moderately Utilized (2.50 – 3.49), Slightly Utilized (1.50 – 2.49), Least Utilized (1.00 – 1.49)*

Project-based environmental activities (WM = 3.55) further demonstrate the use of hands-on learning to deepen students' understanding, while monitoring and evaluation of school initiatives obtained the lowest mean (WM = 3.54), suggesting that program assessment is practiced but could still be strengthened. Overall, the findings imply that school-based initiatives are highly effective in promoting climate literacy and disaster education through active student involvement and structured programs, although continuous evaluation is still needed to ensure sustainability and improvement of implementation (Reyes & Molina, 2024).

**Table 8**  
**Extent of Utilization of the Different Strategies in Promoting Climate Literacy and Disaster Education in terms of Technology-Based Strategies**

| The teacher                                   | Weighted Mean | Verbal Interpretation | Rank |
|-----------------------------------------------|---------------|-----------------------|------|
| 6. Uses multimedia presentations, videos, and | 3.51          | Highly                | 1    |

|                                                                                                       |             |                            |   |
|-------------------------------------------------------------------------------------------------------|-------------|----------------------------|---|
| simulations to teach climate literacy topics.                                                         |             | Utilized                   |   |
| 7. Employs online learning platforms to provide additional resources on disaster preparedness.        | 3.41        | Moderately Utilized        | 3 |
| 8. Integrates social media campaigns or online awareness programs for students.                       | 3.45        | Moderately Utilized        | 2 |
| 9. Provides interactive quizzes and games online to reinforce climate change and disaster concepts.   | 3.26        | Moderately Utilized        | 4 |
| 10. Uses virtual field trips or simulations to illustrate the effects of climate change or disasters. | 3.07        | Moderately Utilized        | 5 |
| <b>Composite Mean</b>                                                                                 | <b>3.34</b> | <b>Moderately Utilized</b> |   |

*Legend: Highly Utilized (3.50 – 4.00), Moderately Utilized (2.50 – 3.49), Slightly Utilized (1.50 – 2.49), Least Utilized (1.00 – 1.49)*

Table 8 presents that the extent of utilization of technology-based strategies in promoting climate literacy and disaster education is Moderately Utilized, with a composite mean of 3.34, indicating that teachers use technology in instruction but not consistently across all learning activities. The highest-rated indicator was the use of multimedia presentations, videos, and simulations (WM = 3.51), showing that visual and audio tools are commonly used to enhance students' understanding of climate and disaster concepts. Indicators such as integrating social media campaigns (WM = 3.45) and using online learning platforms (WM = 3.41) were also moderately utilized, suggesting occasional use depending on access and availability of resources, while interactive quizzes, games, and virtual field trips obtained lower means (WM = 3.26–3.07), reflecting limited use of more advanced digital tools. Overall, the findings imply that although technology is present in climate and disaster education, its application remains inconsistent and largely focused on basic multimedia tools, with more advanced digital strategies needing further strengthening (Cruz & Mendoza, 2024).

**Table 9**  
**Extent of Utilization of the Different Strategies in Promoting Climate Literacy and Disaster Education in terms of Community Engagement Strategies**

| The school                                                                                                            | Weighted Mean | Verbal Interpretation | Rank |
|-----------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|------|
| 11. Collaborates with local government units, NGOs, and barangay officials in climate and disaster programs.          | 3.54          | Highly Utilized       | 2.5  |
| 12. Encourages parental involvement in students' climate literacy and disaster preparedness activities.               | 3.55          | Highly Utilized       | 1    |
| 13. Organizes community outreach programs or advocacy campaigns with students.                                        | 3.54          | Highly Utilized       | 2.5  |
| 14. Invites resource persons from the community to conduct seminars or workshops on climate change and disaster risk. | 3.50          | Highly Utilized       | 4    |
| 15. Monitors and coordinates with community stakeholders to evaluate the impact of school programs                    | 3.49          | Moderately Utilized   | 5    |

|                                    |             |                        |  |
|------------------------------------|-------------|------------------------|--|
| on climate and disaster awareness. |             |                        |  |
| <b>Composite Mean</b>              | <b>3.52</b> | <b>Highly Utilized</b> |  |

*Legend: Highly Utilized (3.50 – 4.00), Moderately Utilized (2.50 – 3.49), Slightly Utilized (1.50 – 2.49), Least Utilized (1.00 – 1.49)*

Table 9 indicates that community engagement strategies in promoting climate literacy and disaster education are Highly Utilized, reflected by a composite mean of 3.52. This suggests that schools maintain active collaboration with parents, local government units, NGOs, and other community stakeholders in supporting climate and disaster-related programs. Parental involvement emerged as the strongest aspect (WM = 3.55), showing that families play a key role in reinforcing students' learning and practices at home. Strong implementation is also evident in partnerships with community organizations and the conduct of outreach activities (WM = 3.54), along with the use of resource persons for seminars and workshops (WM = 3.50), which provide learners with broader, real-world perspectives on environmental issues. On the other hand, monitoring and evaluation of these collaborations recorded the lowest mean (WM = 3.49), suggesting that follow-through mechanisms are not as consistently applied. Overall, the results highlight that while community participation is well-established and beneficial in strengthening students' climate literacy and disaster preparedness, improving program evaluation and coordination remains necessary to sustain its effectiveness (Reyes & Molina, 2024).

### Section 3. Relationship Between Variables

**Table 10**  
**Relationship Between Assessments on Climate Literacy in Terms of Knowledge and on the Extent of Utilization of Different Strategies**

| Variable                         | r - value | p - value | Decision on $H_0$ | Conclusion  |
|----------------------------------|-----------|-----------|-------------------|-------------|
| Instructional Strategies         | 0.50      | <0.001    | Reject            | Significant |
| Disaster Preparedness Strategies | 0.47      | <0.001    | Reject            | Significant |
| School-Based Practices           | 0.41      | <0.001    | Reject            | Significant |
| Technology-Based Strategies      | 0.35      | <0.001    | Reject            | Significant |
| Community Engagement Strategies  | 0.51      | <0.001    | Reject            | Significant |

**\*\*Correlation at 0.01 level significance (2-tailed test)**

Table 10 shows a statistically significant relationship between students' climate literacy in terms of knowledge and the extent of utilization of different strategies, as indicated by p-values <0.001, leading to the rejection of the null hypothesis. The results reveal moderate positive correlations, with community engagement ( $r = 0.51$ ) and instructional strategies ( $r = 0.50$ ) showing the strongest relationships, followed by disaster preparedness and school-based practices. Technology-based strategies showed a lower but still significant correlation ( $r = 0.35$ ), suggesting that their effectiveness depends on proper integration. Overall, the findings imply that

a combination of instructional, school-based, community, and technological strategies contributes to improving students' climate literacy knowledge.

**Table 11**  
**Relationship Between Assessments on Climate Literacy in Terms of Attitude and on the Extent of Utilization of Different Strategies**

| Variable                         | r - value | p - value | Decision on $H_0$ | Conclusion  |
|----------------------------------|-----------|-----------|-------------------|-------------|
| Instructional Strategies         | 0.57      | <0.001    | Reject            | Significant |
| Disaster Preparedness Strategies | 0.63      | <0.001    | Reject            | Significant |
| School-Based Practices           | 0.56      | <0.001    | Reject            | Significant |
| Technology-Based Strategies      | 0.52      | <0.001    | Reject            | Significant |
| Community Engagement Strategies  | 0.57      | <0.001    | Reject            | Significant |

\*\*Correlation at 0.01 level significance (2-tailed test)

Table 11 reveals a significant relationship between students' climate literacy in terms of attitude and the extent of utilization of different strategies, as reflected in p-values <0.001, leading to the rejection of the null hypothesis. The results indicate moderate to strong positive correlations, with disaster preparedness strategies showing the highest relationship ( $r = 0.63$ ), followed by instructional, school-based, and community engagement strategies, all of which contribute to shaping students' environmental values and perspectives. Technology-based strategies ( $r = 0.52$ ) also show a significant link, suggesting that interactive and digital tools help reinforce attitude development. Overall, the findings imply that students develop stronger environmental attitudes when exposed to a combination of experiential, participatory, and technology-supported learning strategies, rather than through passive instruction alone.

**Table 12**  
**Relationship Between Assessments on Climate Literacy in Terms of Practices and on the Extent of Utilization of Different Strategies**

| Variable                         | r - value | p - value | Decision on $H_0$ | Conclusion  |
|----------------------------------|-----------|-----------|-------------------|-------------|
| Instructional Strategies         | 0.57      | <0.001    | Reject            | Significant |
| Disaster Preparedness Strategies | 0.65      | <0.001    | Reject            | Significant |
| School-Based Practices           | 0.63      | <0.001    | Reject            | Significant |
| Technology-Based Strategies      | 0.62      | <0.001    | Reject            | Significant |
| Community Engagement Strategies  | 0.55      | <0.001    | Reject            | Significant |

\*\*Correlation at 0.01 level significance (2-tailed test)

Table 12 indicates a significant relationship between students' climate literacy in terms of practices and the extent of utilization of different strategies, as shown by p-values <0.001,



leading to the rejection of the null hypothesis. The results reveal strong positive correlations, with disaster preparedness strategies ( $r = 0.65$ ), school-based practices ( $r = 0.63$ ), and technology-based strategies ( $r = 0.62$ ) showing the highest associations. Instructional and community engagement strategies also show significant relationships, suggesting that both classroom learning and real-world involvement help translate knowledge and attitudes into actual behavior. Overall, the findings imply that students are more likely to practice environmentally responsible actions when exposed to consistent, hands-on, and integrated strategies across instruction, school programs, community activities, and technology use.

#### Section 4. Challenges Encountered

Table 13 shows that both students and teachers agree that challenges exist in promoting climate literacy and disaster education, with a composite mean of 2.97. The most prominent issue is insufficient class time for climate and disaster topics (WM = 3.19), followed by limited family and community involvement (WM = 3.12), indicating that time constraints and weak external support hinder effective implementation. Respondents also identified difficulties in accessing adequate instructional materials (WM = 3.01) and reliable information (WM = 2.97), suggesting that resource availability remains a key concern in delivering climate-related lessons effectively. In addition, lower engagement among students and limited school promotion of related programs (both WM = 2.83) reflect challenges in motivation and institutional support, which affect participation in climate and disaster activities.

**Table 13**  
**Challenges encountered by students and teachers in promoting climate literacy and disaster education**

| Students and teachers are challenged to                                                                  | Weighted Mean | Verbal Interpretation | Rank |
|----------------------------------------------------------------------------------------------------------|---------------|-----------------------|------|
| 11. Cover topics on climate change and disaster preparedness adequately during class time                | 2.95          | Agree                 | 6    |
| 12. Prioritize lessons on climate change and disaster preparedness alongside other subjects              | 2.91          | Agree                 | 8    |
| 13. Provide sufficient learning materials such as books, videos, or activities about climate change      | 3.01          | Agree                 | 3    |
| 14. Promote programs and events related to climate and disaster awareness                                | 2.83          | Agree                 | 9.5  |
| 15. Involve family and community actively in activities related to climate change and disaster education | 3.12          | Agree                 | 2    |
| 16. Show strong interest and participate actively in climate and disaster-related topics or activities   | 2.83          | Agree                 | 9.5  |
| 17. Connect climate and disaster education with other subjects or areas of learning                      | 2.98          | Agree                 | 4    |
| 18. Access clear and accurate information about climate change to understand the topic effectively       | 2.97          | Agree                 | 5    |



|                                                                                                               |             |              |   |
|---------------------------------------------------------------------------------------------------------------|-------------|--------------|---|
| 19. Demonstrate and assess learning about climate change and disasters through tests, projects, or activities | 2.94        | Agree        | 7 |
| 20. Allocate sufficient class time to explore and learn more about climate change and disaster preparedness   | 3.19        | Agree        | 1 |
| <b>Composite Mean</b>                                                                                         | <b>2.97</b> | <b>Agree</b> |   |

*Legend: Strongly Agree (3.50 – 4.00), Agree (2.50 – 3.49), Disagree (1.50 – 2.49), Strongly Disagree (1.00 – 1.49)*

Overall, the findings imply that while climate literacy and disaster education are being implemented, their effectiveness is constrained by limited time, insufficient resources, weak stakeholder involvement, and low student engagement (UNESCO, 2022).

### Section 5: Proposed Strategic Activities

Table 14 presents the proposed strategic activities to enhance climate literacy and disaster education based on the findings of the study. The results show that students have a moderate level of climate literacy, with understanding of basic environmental concepts but difficulty in more complex topics, and inconsistent participation in climate and disaster preparedness activities. Teachers frequently apply experiential and collaborative strategies, but gaps remain in technology use, instructional materials, program monitoring, and community involvement, while limited class time further affects implementation. To address these issues, the proposed strategies emphasize interdisciplinary integration of climate and disaster topics aligned with MELCs, regular disaster drills and simulations in coordination with DRRM offices, development of updated instructional materials, teacher training, and the establishment of a Climate Literacy/DRRM club to strengthen student engagement.

The plan also highlights the importance of community involvement through partnerships with parents, LGUs, barangay officials, and NGOs, along with activities such as seminars, tree planting, and awareness campaigns. The use of technology-based tools like multimedia presentations, simulations, and online platforms is included to improve understanding of complex concepts, complemented by school-based environmental projects, monitoring and evaluation, and sufficient instructional time to ensure sustainability. Overall, these strategic activities aim to address gaps in knowledge, attitudes, and practices by integrating instruction, experiential learning, technology, and collaboration, ultimately strengthening students' climate literacy, disaster preparedness, and responsible environmental behavior.

**Table 14**  
**Proposed Strategic Activities to Enhance Climate Literacy and Disaster Preparedness Education**  
(Based on the findings and conclusions of the study)

| Activity                                     | Objective                                     | Persons Involved    | Time Frame   | Expected Output         |
|----------------------------------------------|-----------------------------------------------|---------------------|--------------|-------------------------|
| Integration of climate literacy and disaster | To strengthen students' knowledge, attitudes, | School Head, Master | Whole School | Improved integration of |

|                                                              |                                                                                                          |                                                               |                     |                                                                                   |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------|
| education in different subjects                              | and practices through interdisciplinary instruction aligned with MELCs                                   | Teachers, Subject Teachers                                    | Year                | climate and disaster topics in lesson plans                                       |
| Conduct of regular disaster drills and simulation activities | To develop students' preparedness and proper response during emergencies                                 | School Head, DRRM Coordinator, Teachers, LDRRMO, Students     | Quarterly           | Students demonstrate correct response during earthquake, fire, and typhoon drills |
| Development and provision of instructional materials         | To provide sufficient and updated learning resources on climate change and disaster preparedness         | SDO Officials, School Head, Teachers, DRRM Coordinator        | First Semester      | Availability of modules, videos, activity sheets, and digital resources           |
| Teacher training and seminar on climate literacy and DRRM    | To enhance teachers' competence in using effective strategies in teaching climate and disaster education | SDO Trainers, School Head, Teachers                           | Once every semester | Teachers apply improved instructional and technology-based strategies             |
| Establishment of Climate Literacy / DRRM Club                | To increase student participation in environmental and disaster preparedness activities                  | School Head, Club Adviser, Students, YES-O / DRRM Coordinator | Whole School Year   | Active student organization conducting projects and campaigns                     |
| Community outreach and partnership programs                  | To strengthen collaboration between school, parents, and community in climate and disaster education     | School Head, Teachers, Parents, LGU, Barangay Officials, NGOs | Twice a year        | Conducted seminars, tree planting, and disaster awareness programs                |
| Use of technology-based learning strategies                  | To make lessons more engaging through multimedia, online platforms, and simulations                      | Teachers, ICT Coordinator, Students                           | Whole School Year   | Increased use of videos, presentations, and online activities in lessons          |
| School-based environmental and sustainability projects       | To develop students' responsibility through actual practice                                              | Teachers, Students, School Head, YES-O,                       | Every Quarter       | Clean-up drives, recycling projects, tree planting, and                           |

|                                                                |                                                                        | DRRM Coordinators                              |                      | awareness campaigns                                              |
|----------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------|----------------------|------------------------------------------------------------------|
| Monitoring and evaluation of climate literacy programs         | To assess effectiveness of strategies and improve implementation       | School Head, DRRM Coordinator, Master Teachers | End of every Quarter | Evaluation report and improved action plans                      |
| Allocation of sufficient time for climate and disaster lessons | To ensure adequate discussion and mastery of climate literacy concepts | School Head, Teachers, Curriculum Planner      | Whole School Year    | More time allotted for climate and disaster education activities |

## Discussion

The findings of the study indicate that the utilization of diverse instructional, school-based, disaster preparedness, technology-based, and community engagement strategies contributes to the enhancement of students' climate literacy and disaster preparedness. In general, students demonstrated a moderate level of climate literacy in terms of knowledge, attitudes, and practices, suggesting that while they possess foundational understanding and positive dispositions toward environmental issues, these have not yet fully translated into consistent real-life application. Similarly, teachers reported high utilization of instructional strategies, while disaster preparedness, school-based, and community engagement strategies were also strongly implemented. However, technology-based strategies were only moderately utilized, reflecting uneven integration of digital tools in teaching climate-related concepts.

When compared to existing literature, these findings align with the emphasis that experiential, participatory, and community-based approaches are more effective in developing environmental awareness and preparedness among learners (WWF Philippines, 2021). The results also support studies highlighting that students develop deeper understanding when learning is contextualized through real-life experiences such as drills, simulations, and community involvement (UNICEF, 2022; Reyes & Santos, 2022). However, the observed limitations in technology integration and resource availability are consistent with previous findings that many schools still face constraints in fully implementing digital and multimedia-based climate education (Cruz & Mendoza, 2024; Santos, 2023). The challenges identified—such as limited instructional time, insufficient learning materials, and weak community participation—further reinforce earlier studies emphasizing that effective climate education requires strong institutional support and sustained stakeholder collaboration (UNESCO, 2022).

In terms of implications for practice and policy, the results suggest the need to strengthen interdisciplinary integration of climate literacy and disaster education across subjects, ensuring that learning is not confined to isolated lessons but embedded in daily instruction. Schools may also benefit from enhancing teacher training programs focused on both pedagogical and

technological competencies, as well as expanding access to updated instructional materials and digital resources. At the policy level, stronger collaboration among schools, local government units, and community stakeholders should be institutionalized to sustain disaster preparedness programs and environmental initiatives. Allocating sufficient instructional time for climate and disaster education is also critical to address one of the major barriers identified in the study.

Despite these contributions, the study has several limitations. It is limited to selected Junior High Schools in Congressional District I, SDO Batangas Province, which may affect the generalizability of the findings to other regions or educational contexts. The study also relies on self-reported data from teachers and students, which may be subject to response bias. Additionally, external factors such as school resources, leadership support, and community socioeconomic conditions were not deeply examined, although they may significantly influence the implementation of climate literacy and disaster education strategies.

## **Conclusion**

Based on the major findings of the study, the researcher drew the following conclusions:

1. The teachers assessment showed that students demonstrated moderate awareness on knowledge, attitudes, and practices.
2. The self-assessment of the teachers obtained high utilization of instructional strategies, school-based practices, and community engagement strategies, while moderate utilization on disaster preparedness and technology-based strategies.
3. There is a significant relationship between students' climate literacy and the extent of strategy utilization in promoting climate literacy and disaster education.
4. The major challenges identified include insufficient time allocation, the need for stronger support systems from families and the community, and limited instructional resources.
5. Strategic activities are proposed to enhance climate literacy and disaster education among students.

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