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EFFECTIVENESS OF INTEGRATING CLIMATE CHANGE EDUCATION ACROSS CURRICULUM: AWARENESS AMONG ELEMENTARY LEARNERS

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ABSTRACT

This study evaluated the effectiveness of integrating climate change education in elementary schools across curriculum content integration, teaching methods and strategies, understanding of climate change concepts, and behavioral intentions toward environmental action. It also assessed learners' climate change awareness regarding causes, effects, and everyday environmental behaviors, while establishing relationships between integration effectiveness and awareness levels. Specifically, the research measured these dimensions, determined qualitative effectiveness levels ("Very Highly Effective," "Very Great Extent"), and identified significant correlations influencing environmental consciousness. Employing a descriptive-correlational design, data from elementary learners were collected through validated surveys and analyzed using descriptive statistics (means, standard deviations, qualitative interpretations) and Pearson Product-Moment Correlation. Integration effectiveness rated very highly for content embedding of climate themes and local-global impacts across subjects, and for learner-centered teaching via real-world examples, multimedia, interactive activities, project-based learning, and discussions. Conceptual understanding proved very highly effective, with learners grasping climate science, mitigation roles, and multi-stakeholder responsibilities. Behavioral intentions rated highly effective, reflecting motivation for sustainability advocacy, resource conservation, school activities, and carbon reduction. Learners' climate change awareness reached very great extent overall, encompassing causes, ecosystem effects, individual agency, and pro-environmental practices. Correlation analysis showed significant positive relationships ($p <$

.01): overall effectiveness (r = .596), teaching methods/strategies (r = .570), understanding (r = .558), behavioral intentions (r = .469), content integration (r = .430). These affirm interactive pedagogies and conceptual grounding as key drivers of awareness. The findings highlight coherent, experiential climate education's role in cultivating informed, action-oriented learners for environmental stewards.

KEYWORDS: *climate change education, curriculum integration, environmental awareness, elementary learners, environmental behavior.*

INTRODUCTION

Climate change is one of the most pressing challenges facing communities, livelihoods, and the well-being of future generations worldwide. Its effect became more visible in recent years, even in such neighboring communities like Valencia City, Bukidnon, where alterations in the weather pattern, increased intensity of typhoons, and unpredictable rainfall altered the daily lives and the school operations. As a Grade 6 teacher, the researcher is well aware of the need to view climate change as a scientific, yet practical phenomenon that affects their environment, safety, and future having havng personally experienced these changes.

In the classroom, it has dawned on me that most elementary school students possess very limited knowledge about how climate change happens and the way it affects their community as well as simple things that they can do to contribute to the cause. Climate change education is often perceived as an isolated unit of instruction and not as a sustained and comprehensive process of learning, although certain subjects refer to environmental concerns incidentally. This gap in knowledge is a challenge to teachers who would want to empower students to be environmentally conscious and responsible citizens.

It has also become evident in the classroom that a considerable portion of elementary school students know a great deal less about how climate change occurs, and one of the biggest ways of bridging the gap is to integrate Climate Change Education (CCE) across the curriculum. Climate awareness can be included in the choice of English reading, math word problems, social studies discussions, and even EPP or MAPEH activities, instead of the teaching of science-related ideas. This approach renders learning more related, pertinent, and effective by subjecting the students to climate-related ideas on a frequent basis in a number of subjects. Being a teacher who has tried to incorporate environmental issues into the lesson, the researcher discovered that when the lesson is linked to the real world, like the issue of

flooding in the adjacent barangays, the increasing temperature during dry months or issues with waste disposal at schools, the learner is more interested.

Although such pedagogical practices seem to be promising, there is still a need to determine the success of integrating climate change education in creating awareness in elementary school learners. The awareness level will help schools to improve their instructional methods and support programs that will equip young learners to manage the problem of the environment.

Climate change is one of the biggest challenges our world is facing today, and it's important that young learners understand what it is and why it matters. Schools have a special role in teaching students about climate change by including ideas about the environment and its protection in different subjects. This approach helps students see the bigger picture of how climate change happens, the problems it causes, and what we can do to help.

In the Philippines, where many communities often face strong storms, floods, and other climate-related problems, teaching children about these issues early on is especially important. Elementary learners are at a good age to learn about complex topics like climate change and to think more deeply about their role in protecting the planet. What they learn can also influence how their families and communities take care of the environment.

Even though schools have started including climate change topics in their lessons, there is still not enough information about how well this is increasing learners' awareness, especially for younger learners. This study aims to explore how effective teaching climate change across different subjects is in helping elementary learners become more aware and informed. By looking at what works well and what can be improved, this research hopes to guide teachers and school leaders in making climate education better.

Thus, the aim of the research, Effectiveness of Integrating Climate Change Education Across Curriculum: Awareness Among Elementary Learners, is to examine the impact of a curriculum integration on the level of knowledge and understanding of climate change in elementary learners.

The overall goal is to help build a learning environment that encourages children to be responsible and active when it comes to taking care of the Earth. When elementary learners understand climate change better, they are more likely to grow into adults who care deeply about the environment and take action to protect it. This study shows how important it is to design school programs that empower students to be positive changemakers for the future.

Framework of the Study

The theoretical framework for the study "Assessing the Effectiveness of Integrating Climate Change Across the Curriculum: Awareness Among Elementary Learners" rests on several interrelated educational and environmental theories that together explain how curriculum integration can shape learners' climate awareness and behavior. The independent variable in this study is the integration of climate change concepts across the curriculum, which involves embedding environmental topics and sustainability themes into various learning areas such as science, social studies, and language arts. The dependent variable is the level of awareness and pro-environmental behavior among elementary learners, reflected in their knowledge, attitudes, and actions related to climate change. This relationship operates within a framework built upon curriculum theory, environmental education principles, cognitive development theory, behavioral change models, and constructivist pedagogy.

Social studies and science education theories provide the foundation for understanding how curriculum design can cultivate learners' understanding of their physical environment, human survival challenges, and sustainable living practices. This aligns with the objectives of climate change education, aiming to promote environmental awareness, critical thinking, and responsible action. Environmental education theories further emphasize that developing awareness must be accompanied by nurturing positive environmental attitudes and enabling learners to practice sustainable behaviors, thereby transforming knowledge into action. Cognitive development theory supports the focus on elementary learners, as their cognitive stage allows them to understand cause-and-effect relationships and develop a sense of agency and social responsibility essential for climate awareness.

Behavioral change theories, particularly the Theory of Planned Behavior and Social Cognitive Theory, explain how learners' knowledge and attitudes influence their willingness to adopt pro-environmental behaviors. These frameworks highlight the importance of perceived control, social norms, and self-efficacy in determining whether awareness leads to sustainable action. Constructivist pedagogy further strengthens this framework by emphasizing learner-centered, experiential approaches such as discussions, role-playing, and project-based activities that enable students to construct meaning through real-world experiences. By engaging learners actively, the curriculum reinforces understanding and motivation to act on climate issues.

Overall, the interconnection among these theories suggests that effective integration of climate change education across the curriculum can enhance learners' awareness, shape

positive attitudes, and promote environmentally responsible practices. Through this theoretical lens, the study underscores the potential of curriculum integration as a transformative tool for cultivating informed, responsible, and climate-resilient future citizens.

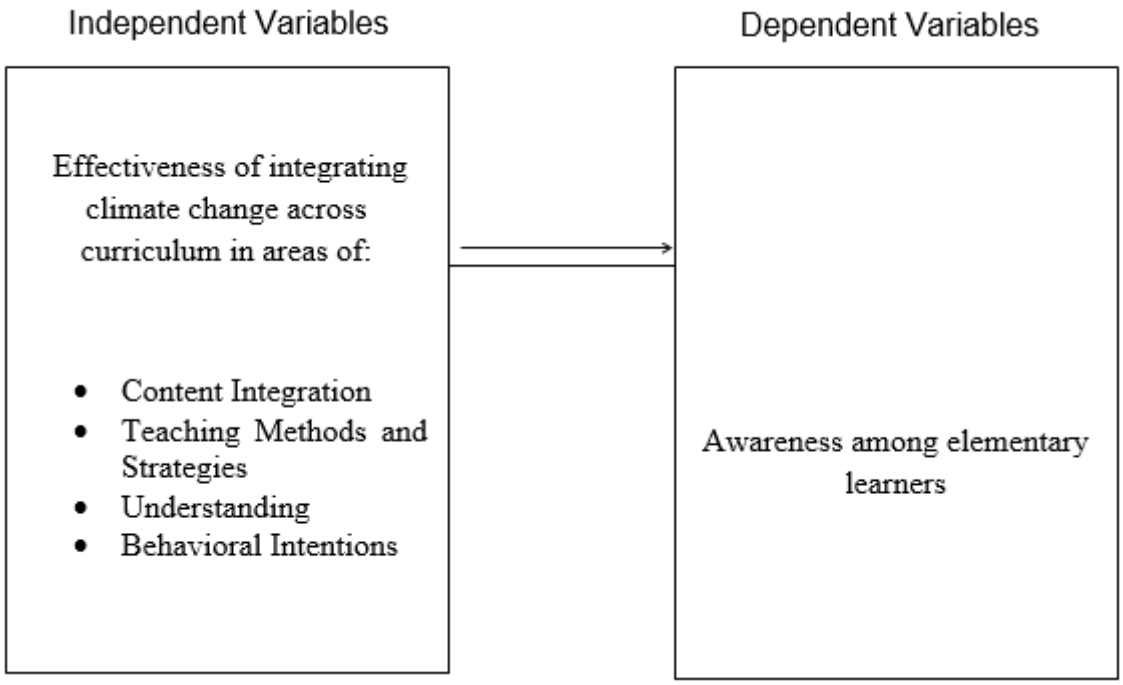

Figure 1. Schematic Diagram showing the Relationship of the Independent and Dependent Variables of the Study.

Delimitations of the Study

This research was delimited to find the relationship between the level of effectiveness of integrating climate change across the curriculum and awareness among elementary learners.

The independent variables were the effectiveness of integrating climate change across the curriculum in terms of the curriculum content integration, teaching methods, and strategies, understanding, and behavioral intentions.

The dependent variable are awareness and practices among elementary learners in School Year 2025-2026.

This study used a survey questionnaire that the researcher adapted. The respondents of this study are learners of schools located in the Division of Valencia City. The researcher treated the data with descriptive statistics, such as frequency count, percentage, mean, standard deviation, t-test of significant difference, and Pearson r Product Moment Correlation Coefficient.

A Review of Related Literature and Studies

This chapter examines the level of effectiveness of integrating climate change across curriculum on awareness among elementary learners. It incorporates sub-variables to provide specific information about the various predictors assessing the integration of climate change education in the curriculum. The following theories portray the common factors that contribute to the awareness among elementary learners:

Integration of Climate Change Education

Climate change education has become a critical component of the Philippine basic education curriculum in response to the country's vulnerability to climate-related disasters. According to the Department of Education (DepEd, 2021), the Philippines has integrated key climate change concepts across various subjects from kindergarten to senior high school. This integration aims to build climate literacy at an early age, enabling learners to understand the causes, effects, and social implications of climate change in their own communities.

A specially designed module on Climate Change, Disaster Risk Reduction, and Local Environmental Issues for Grade 10 learners exemplifies this integration in practice. The module encourages active learning through activities such as role-playing city council sessions and project-based tasks to deepen students' understanding of political, economic, and social aspects of climate. Such an approach reflects a shift from traditional memorization to participatory learning that fosters critical thinking and real-world application of knowledge.

Moreover, research has highlighted that Filipino learners are particularly at risk due to frequent exposure to typhoons, floods, and other climate impacts, making climate change education both relevant and urgent (Department of Education, 2021). Programs like the Youth for Environment in Schools Organization and the National Greening Program complement curriculum efforts by involving students in environmental stewardship and action-oriented projects, which enhance their behavioral responses and community engagement.

Studies assessing the effectiveness of these educational efforts emphasize the need for ongoing support for teachers and curriculum developers. For instance, the Disaster Risk Reduction and Management Service (DRRMS) under DepEd continues to provide training and resources to improve teacher capacity in delivering climate change content effectively across the curriculum (DepEd, 2021). This institutional support is crucial to ensure that climate change education translates into both heightened awareness and positive environmental practices among learners.

Numerous recent studies emphasize the critical role of integrating climate change education across the curriculum to raise climate literacy among young learners. Amoakwah et al. (2025) investigated teachers' knowledge of climate change and found that while teachers generally have robust knowledge about climate issues, gaps still exist in curriculum content that limit effective climate education delivery. Their research highlighted that content often lacks comprehensive climate change topics necessary to fully engage learners, and recommended curriculum enhancement alongside active learner involvement in pro-environmental activities to boost effectiveness.

A meta-analysis by Aeschbach et al. (2025) examined the overall effectiveness of climate change education across multiple interventions. The study revealed that climate change education significantly improves students' climate-related knowledge with medium to large effect sizes. However, changes in attitudes and behaviors were less pronounced, suggesting that while knowledge acquisition is strong, translating understanding into sustained behavioral changes remains challenging. The analysis further suggested that the content focus, treatment duration, and teacher delivery quality are important moderators affecting the success of climate change education programs.

Additional global frameworks emphasize that social studies is well-positioned to integrate climate change education due to its interdisciplinary nature, dealing with societal, economic, and political dimensions of climate issues (UNESCO, 2025). This integration supports the development of critical thinking skills, civic responsibility, and informed decision-making among learners, aligning well with sustainable development goals.

Research also shows that educating teachers is a key factor in successful climate change curriculum integration. Pre-service and in-service teacher training enhances their understanding and pedagogical skills related to climate change, which in turn positively influences learners' outcomes Tolppanen et al., (2020) and Amoakwah et al., (2025). Effective teaching methods, such as project-based learning, discussions, and real-world applications, have been recommended to engage learners actively and promote deeper learning and behavioral engagement (IOSR Journals, 2025).

In relation to the literature, these findings are consistent with research indicating that well-integrated climate education strengthens both cognitive and affective dimensions of environmental awareness. Global guidance from UNESCO (2020) and UNCC-LEARN (2017) emphasizes that coherent content integration, engaging teaching strategies, and opportunities to develop understanding and behavioral intentions are essential to building

strong climate awareness in young learners. Boyes, Skamp, and Stanley (2025), in their work on climate change curricula, similarly report that programs combining scientific knowledge with practical, participatory methods and reflection on personal and social responsibility tend to produce higher levels of environmental awareness and self-reported understanding. Stadelmann-Thurston et al. (2025) further note that when learners perceive that their schools consistently connect climate change to daily life and action, their awareness scores rise measurably.

Integration of Climate Change Education Across *Curriculum in terms of Content Integration*

Climate change education has become a critical component of the Philippine education system, particularly integrated within the social studies curriculum, to respond to the country's vulnerability to environmental hazards. The Enhanced Basic Education Act of 2013 (K-12 program) mandates the inclusion of Disaster Risk Reduction and Management (DRRM) and Climate Change Adaptation (CCA) concepts across grade levels and subjects, including social studies (Department of Education [DepEd], 2021). This integration aims to provide learners with not only theoretical knowledge but also a practical understanding of climate-related issues from local to global contexts.

Content integration in the Philippines has been designed to align climate change education with social, economic, and political dimensions, which are key components of social studies. For example, modules like the Module on Climate Change, Disaster Risk Reduction, and Local Environmental Issues involve active learning where learners discuss the political, economic, and social aspects of climate change in their communities (CHR-PFT & DepEd Quezon City Division, 2025). Through activities such as mock city council sessions and role-playing, learners develop a deeper awareness of government policies, community vulnerability, and resilience strategies, thereby contextualizing climate change within governance and societal responses.

Furthermore, the curriculum content exposes students to the impacts of climate change, emphasizing their effects on the environment, society, economy, and vulnerable groups like women and children. This comprehensive approach ensures that learners appreciate the multidimensional challenges posed by climate change and the importance of collective action (CHR-PFT & DepEd Quezon City Division, 2025). It also encourages critical reflection on the roles of individuals, communities, and government bodies in mitigating climate risks.

Research on content integration shows that by embedding climate change education, Filipino learners become more climate literate and are better prepared to participate in environmental

stewardship activities (DepEd, 2021). The curriculum's integration strategy has been complemented by co-curricular programs, such as the Youth for Environment in Schools Organization (YES-O), solid waste management campaigns, and tree-planting initiatives under the National Greening Program. These activities reinforce classroom learning with tangible community involvement, which strengthens learners' commitment to environmental sustainability.

Challenges remain, however, including the need for more teacher training on climate change topics and pedagogy, adequate learning resources, and continuous curriculum updates to address emerging climate issues (DepEd, 2021). Nonetheless, the Philippine approach to integrating climate change education into social studies curriculum demonstrates a proactive model that promotes learner awareness of environmental issues and their societal context, fostering a generation capable of thoughtful climate action.

The integration of climate change education (CCE) across the curriculum aims to equip learners with knowledge about the causes, impacts, and solutions to climate change while situating these within broader social, economic, and political contexts. A meta-analysis by Aeschbach, Schwichow, and Riess (2025) showed that curriculum content that includes in-depth knowledge of climate causes and effects, coupled with action-oriented knowledge, significantly improves learners' climate literacy. The effectiveness of such content integration was found to be stronger when curricula addressed not only basic climate science but also how climate change affects societal systems and individual behaviors.

Content integration of climate change across the curriculum is acknowledged as essential because it leverages across learning areas' multidisciplinary nature to address climate change from various perspectives, including governance, community impact, and policy-making. Eilam (2025) emphasizes that effective climate change curricular content should address socio-economic-political issues underpinning climate problems while also incorporating disaster risk reduction and sustainability themes to deepen learners' understanding and engagement.

However, research points to challenges in achieving effective integration at the curriculum level. Amoakwah et al. (2025) reported that despite the recognized importance of climate change education, curricula in some contexts lack sufficient and coherent climate change content, hindering teachers' ability to deliver comprehensive lessons. This gap affects the overall effectiveness of the curriculum in raising awareness and fostering behavioral intentions among learners. Adequate content integration requires careful thematic

organization, age-appropriate sequencing, and teacher preparedness to facilitate climate change learning meaningfully.

Further, the quality of curriculum content and how it is taught influences student outcomes. According to the meta-analysis by Aeschbach et al. (2025), teaching that integrates complex system knowledge about climate with real-world applications maximizes knowledge gains and modestly improves attitudes and behaviors. This signals that curriculum content alone is insufficient; it must be supported by pedagogical approaches that make learning relevant and actionable across learning areas.

Integration of Climate Change Education Across *Curriculum in terms of Teaching methods and strategies*

The Department of Education (DepEd) has incorporated teaching strategies that stimulate critical thinking, collaboration, and real-world problem-solving. For example, modules developed for classes encourage the use of K-W-L charts (What learners Know, Want to know, and have Learned), group discussions, role-playing, and project-based learning activities. These approaches allow learners to explore the political, economic, and social dimensions of climate change within their communities, enabling learners to relate abstract climate concepts to their everyday lives (CHR-PFT & DepEd Quezon City Division, 2025).

Multimedia and technology-assisted learning tools are also emphasized to make climate change topics more accessible and engaging for learners. Videos, interactive presentations, and online discussions help contextualize climate science, making complex information easier to grasp for elementary learners (DepEd, 2021). Additionally, the promotion of co-curricular activities such as environmental clubs, youth-led advocacy, and community involvement projects reinforces classroom learning and encourages behavioral change.

Studies have identified the effectiveness of these learner-centered, participatory methods in fostering deeper awareness and actionable practices among Filipino students. The National Climate Change Commission and key educational partners have highlighted the crucial role that teaching methods play in shaping learner attitudes and motivations toward climate resilience (Climate Change Commission, 2024). Interactive pedagogy not only improves knowledge retention but also empowers students to become proactive in local environmental efforts.

Challenges in implementation include the need for teacher training focused on climate literacy and pedagogy, as well as the provision of appropriate learning resources. However, the Department of Education continues to support various programs and workshops to

enhance educators' capacities, ensuring that teaching methods remain effective and relevant (DepEd, 2021).

Recent literature highlights the effectiveness of integrating climate change education (CCE) into curricula, particularly focusing on teaching methods and strategies. A comprehensive meta-analysis by Aeschbach et al. (2025) found that CCE interventions significantly improve climate-related knowledge with medium to large effect sizes, while attitudinal and behavioral changes show smaller but still positive impacts. This meta-analysis emphasizes the value of active and engaging teaching methods that focus on personally meaningful information to enhance learning outcomes in climate change education. It also highlights that longer intervention durations and teacher effectiveness are crucial for improving attitudes towards climate change (Aeschbach et al., 2025).

Further, a systematic review emphasizes diversified teaching approaches, including integrating climate change topics across various subjects in basic education, while noting that science remains the primary focal point. Contextualizing climate change understanding within students' socio-cultural backgrounds and incorporating emotional and cognitive integration are critical. These strategies foster meaningful engagement, which is essential for long-term attitudinal and behavioral changes (PhilArchive, 2022).

Conceptual analyses of climate change curriculum design emphasize the need for thematic and non-linear organization, with attention to socio-economic-political contexts and developmentally appropriate content. These analyses propose frameworks that move beyond traditional knowledge transfer to incorporate experiential, action-based, and collaborative learning strategies, which are more effective in promoting climate action readiness among learners (Eilam, 2025).

Additionally, the literature points out challenges with the traditional science-focused educational model, suggesting that addressing psychosocial factors like anxiety or powerlessness through action-oriented and experiential learning fosters greater motivation for climate action. Integrating climate change education in a manner responsive to diverse learners enhances relevance and impact (UN CC:Learn, 2023).

In conclusion, integrating climate change education benefits most from active, learner-centered, and contextually meaningful teaching strategies that incorporate knowledge, attitudes, and action-oriented approaches. Continuous teacher training and curriculum designs that encompass socio-political dimensions and experiential learning processes are key to improving the effectiveness of these educational interventions.

Integration of Climate Change Education Across *Curriculum in terms of Understanding*

Assessing the effectiveness of integrating climate change education into the curriculum significantly hinges on learners' understanding of climate change concepts. In the Philippine context, climate change education is recognized as an essential component in preparing young learners to navigate and address environmental issues that directly affect their lives and communities. The Climate Change Commission (2024) emphasizes that education must go beyond merely teaching the science of climate change; it should develop climate-literate citizens who comprehend the complexities of climate impacts and can make informed, responsible decisions. Understanding climate change includes knowledge of both natural and human-induced causes, recognition of its effects on socio-economic and environmental systems, and awareness of adaptation and mitigation strategies.

Studies show that learners' grasp of these concepts improves when climate change education is well-integrated across learning areas, where interdisciplinary approaches link scientific ideas to societal, political, and economic realities (Department of Education, 2021). DepEd's K-12 curriculum embeds climate change awareness through modules that contextualize these issues at local, national, and global levels, fostering critical thinking and problem-solving abilities. This approach is affirmed by reports from the United Nations CC:Learn program, which advocates for experiential, action-oriented learning methods to strengthen understanding and engagement (UN CC:Learn, 2020).

However, despite curriculum reforms, challenges remain in ensuring that the depth of understanding among learners translates into meaningful awareness and action. Differences in resource availability and teacher preparedness impact the consistency and quality of climate change education across regions (Department of Education, 2021). Nonetheless, participatory learning strategies and integration within the curriculum provide avenues for learners to connect climate knowledge with real-life contexts, aiding retention and fostering a sense of responsibility.

Overall, research concludes that climate change education effectiveness is closely tied to how well learners understand the issue in its broad scientific and societal context, which in turn influences their readiness to adopt sustainable practices and support climate resilience efforts (Climate Change Commission, 2024; UN CC:Learn, 2020).

A comprehensive meta-analysis by Aeschbach et al. (2025) reveals that CCE interventions significantly improve climate-related knowledge with medium to large effects while producing smaller yet positive changes in attitudes and behaviors toward climate action. The

study emphasizes that knowledge about the causes and effects of climate change within educational content has a stronger impact on mitigation actions than basic climate system knowledge, and that teacher involvement and intervention duration are key moderators of effectiveness (Aeschbach et al., 2025).

Further, research by Amoakwah et al. (2025) focusing on teachers' knowledge indicates that while many teachers possess robust knowledge of climate change and measures to mitigate it, the integration of explicit climate change content in the curriculum is often fragmented or insufficient, limiting comprehensive learner understanding. The study recommends active learner participation in pro-environmental activities facilitated by teachers and collaboration with environmental agencies to enhance the real-world applicability of learned concepts (Amoakwah et al., 2025).

Additional studies, such as the one evaluating climate change communication in schools, highlight the importance of effective communication strategies by teachers and removing institutional barriers to foster greater learner engagement and climate literacy. Teacher preparedness and positive learner attitudes are critical factors influencing successful integration of climate change topics in educational settings (The Critical Review of Social Sciences Studies, 2025).

Integration of Climate Change Education Across *Curriculum in terms of Behavioral Intentions*

Assessing the level of effectiveness of integrating climate change education in the curriculum in terms of behavioral intentions highlights the critical role of education in shaping learners' willingness and commitment to engage in pro-environmental actions. Recent literature within the Philippine context and broader studies emphasize that climate change education enhances not only knowledge but also learners' attitudes and intentions to adopt sustainable practices. According to the Department of Education (2021), the integration of climate change topics within the curriculum encourages learners to develop a sense of responsibility toward environmental stewardship. This education fosters behavioral intentions by informing learners about the impact of their actions and motivating them to participate in activities such as reducing waste, conserving energy, and advocating for climate resilience.

A study by Caisip and Espinosa (2022) revealed that Filipino youth participants displayed moderate awareness of climate impacts and showed intentions to support climate mitigation efforts when adequately educated. Similarly, Lopez and Malay (2019) found that senior high school learners with higher awareness levels exhibited stronger positive attitudes and

intentions toward climate-friendly behaviors. These patterns align with global research, where behavioral intentions are recognized as significant predictors of actual environmental practices. The Theory of Planned Behavior supports this by linking knowledge and attitudes with intentions, which ultimately influence behavior (Monroe et al., 2017).

Moreover, the education sector's efforts in the Philippines to incorporate experiential and community-based learning strategies further strengthen learners' behavioral intentions. Participation in environmental clubs, community clean-up drives, and advocacy initiatives amplifies motivation, leading to lasting behavior change. However, these studies also point to challenges such as disparities in climate literacy and the need for continuous curricular and instructional improvements to sustain positive behavioral intentions over time (DepEd, 2021; Caisip & Espinosa, 2022).

Understanding learners' awareness and practices regarding climate change is crucial for designing effective climate education programs. Recent studies in the Philippines and internationally reveal varying levels of climate change literacy, showing that while awareness may be moderate to high, actual knowledge and consistent environmentally responsible practices may still need strengthening.

A study by Ligsa, Magbanua, Manalo, and Romarate (2024) assessed junior high school learners' climate change literacy in the Philippines. The findings showed that while learners had a generally high perception, action, attitude, and personal concern about climate change, their fundamental knowledge was somewhat below average. This suggests that learners are emotionally and behaviorally engaged but require deeper cognitive understanding to translate awareness into informed practices. The study also identified that climate change education significantly influences learners' awareness more than environmental experiences or peer influence.

In a related Filipino study, Lopez and Malay (2019) found that senior high school students demonstrated moderate to high awareness and positive attitudes toward climate change. Their research emphasized that awareness levels tend to increase with grade level and age, correlating with greater exposure to climate education and related experiences. The study recommended tailoring academic and extracurricular programs to reinforce cognitive and behavioral adaptation among youths.

Further, Caisip and Espinosa (2022) highlighted the gaps in awareness among vulnerable Filipino youth living in urban areas. Approximately half of the participants were moderately aware of climate change impacts but showed limited understanding of specific

issues like agriculture and water resources vulnerability. The study underscored the importance of community-based and inclusive environmental literacy programs to enhance both awareness and sustainable practices.

Internationally, Dzambo et al. (2020) demonstrated that well-designed climate education courses substantially increase learners' knowledge and belief in human-driven climate change. Their results align with the aforementioned local studies, illustrating the need for structured, curriculum-aligned teaching that fosters solid understanding and responsible behaviors.

The Methodology

This study employed the descriptive-correlation design to assess the level of effectiveness of integrating climate change across the curriculum on the awareness among elementary learners in District 3, Valencia City, Bukidnon, for the school year 2025-2026.

Researchers obtained data on the level of the effectiveness of integration of climate change education across curriculum on the awareness among elementary learners through an adapted questionnaire.

The researcher conducted the study in the Division of Valencia City District 3. Valencia City is a fast-growing city in terms of economy and development in Northern Mindanao. This dynamic setting offers background for analyzing how to incorporate climate change teaching.

District III was a highly competitive and performing district among the many in the Division of Valencia. It is run and headed by a leader with our District Focus Supervisor, Noemie M. Pagayon. It consists of 7 schools, specifically Araneta Integrated School, Batangan Integrated School, Lumbayao Integrated School, San Isidro Integrated School, Sinabuagan Integrated School, Dalit Integrated School, and Vintar Integrated School.

These schools, which provide a variety of learner populations and teaching environments, were the main locations for data collection. District III was chosen strategically because of its dedication to academic success and its capacity to offer insightful information on how well elementary students are taught about climate change. A thorough knowledge of how climate change awareness was viewed and incorporated across many communities will be made possible by the varied socioeconomic backgrounds of the students in these institutions.

In this study, the researcher adopted an instrument from Anyanwu, J., & Njoku, C. (2023) on effectiveness of Integrating of climate change education across the curriculum and Anyanwu, J., & Njoku, C. (2023) related to awareness among elementary learners. It consisted of a survey questionnaire with two components.

Part I assessed the level of effectiveness of integrating climate change in education across the curriculum. There are 6 indicators for each variable. The five-point Likert scale serves as the foundation for the choice columns.

Part II dealt with awareness among elementary learners. The area contains 10 items. The response options are present in columns corresponding to a five-point Likert scale. Respondents indicate their selected answer by checking the appropriate column.

This study adhered to the Valencia Colleges Incorporatetd (VCI) protocol. Firstly, the approval and endorsement letter of the Dean of Graduate Studies solicited. Then, submitted to the Schools Division Superintendent of the Division of Valencia City. The researcher requested permission from the District Public Schools District Supervisor when due approval is assured. Next, the School Principal/Head of the chosen schools sought approval for the researcher to conduct a study on their respective schools. Then, the questionnaires were distributed to the respondents.

The study employed the following statistical tools: mean and standard deviation are used to determine the effectiveness of integrating climate change education across the curriculum: awareness among elementary Learners.

Pearson r Product-Moment Correlation Coefficient or Pearson r was utilized to find the connection between the effectiveness of integrating of climate change education across curriculum: awareness among elementary learners.

FINDINGS

The effectiveness of integrating climate change across the elementary curriculum was highly to very highly effective across all dimensions. Content integration systematically embedded climate themes, causes, and local-global impacts across learning areas. Teaching methods and strategies excelled through real-world examples, multimedia, interactive activities, project-based learning, and discussions linking content to learners lived experiences. Understanding of climate change concepts was strong, encompassing science, mitigation strategies, and multi-level roles (individual, societal, governmental), while behavioral intentions showed high motivation for sustainability advocacy, resource conservation, school participation, and carbon footprint reduction. These results highlight the success of coherent, experiential approaches in building informed attitudes and action readiness.

Climate change awareness among elementary learners reached a very great extent overall. This included a clear grasp of causes and effects, recognition of community and ecosystem impacts, belief in small actions' power, and commitment to pro-environmental behaviors like

water and energy conservation. Such elevated awareness demonstrates schools' capacity to foster not just knowledge but practical environmental consciousness via engaging instruction.

A significant positive relationship existed between the effectiveness of climate change integration and learners' awareness. Correlation analysis confirmed statistically significant links across all dimensions, with overall effectiveness, teaching methods/strategies, and conceptual understanding showing the strongest associations. Interactive, multimedia-rich pedagogies proved particularly influential, enhancing climate consciousness beyond mere content delivery and validating holistic educational approaches.

CONCLUSIONS

This study confirms the high effectiveness of integrating climate change education in elementary schools across content integration, teaching methods, strategies, understanding of concepts, and behavioral intentions toward environmental action. These dimensions foster coherent embedding of climate themes in curricula, learner-centered pedagogies like real-world examples, multimedia, interactive activities, and project-based learning, as well as strong comprehension of causes, effects, mitigation roles, and pro-environmental orientations. Learners exhibited substantial climate change awareness, marked by recognition of impacts, belief in individual agency, and commitment to sustainable habits, demonstrating that such integration meaningfully shapes environmental knowledge, attitudes, and readiness for action.

Positive and significant correlations linked all integration dimensions to learners' awareness, with overall effectiveness, teaching methods, and conceptual understanding showing the strongest connections. This illustrates how experiential, interactive instruction and solid conceptual grounding particularly drive heightened awareness, surpassing isolated or didactic approaches. The holistic framework underscores the synergy of content alignment, engaging pedagogies, cognitive mastery, and action-oriented intentions in cultivating informed environmental consciousness.

These findings endorse sustained climate education through curriculum coherence, intensified experiential projects, and reinforced daily practices. Educational stakeholders should prioritize teacher training, school-wide planning, an.d community partnerships to nurture climate-resilient learners equipped with knowledge, values, and stewardship skills for a sustainable future. Therefore, the null hypothesis is not accepted.

Recommendations

Based on the findings of this study, the following recommendations can be made.

The highly to very highly effective integration of climate change across curriculum content, teaching methods, conceptual understanding, and behavioral intentions, school administrators in District III, Division of Valencia City, may prioritize embedding climate themes more systematically into all learning areas through DepEd-aligned resources like multimedia kits and local impact case studies, ensuring seamless connections to learners' lived experiences and community contexts. Professional development workshops for public school teachers, drawing from the total population sampled in this study, could emphasize scaling up interactive strategies such as project-based learning, real-world discussions, and hands-on mitigation activities to deepen conceptual grasp and sustain high motivation for environmental action.

Given the very great extent of climate change awareness encompassing causes, effects, community impacts, and pro-environmental behaviors, teachers are recommended to integrate daily practices like conservation challenges, ecosystem role-playing, and small-action pledges into lessons, bridging cognitive knowledge with practical commitments such as water and energy saving.

To strengthen the significant positive relationships identified, between teaching methods, conceptual understanding, and awareness, district leaders might establish a collaborative teacher network across Valencia City Division for sharing holistic climate education best practices, piloting grant-funded sustainability programs, and conducting annual assessments tracking integration impacts on learner consciousness. Future researchers could expand this total population approach to comparative studies across divisions, incorporating longitudinal tracking of behavioral outcomes.

The local community should actively collaborate with educational stakeholders to improve climate change education. The community can focus on achieving the following: community leaders and organizations should prioritize their relationships with schools, and they should support realistic environmental projects. By collaborating on neighborhood projects, the community can help kids draw links between what they learn in the classroom and real-world community issues; families and the community can actively support and model the eco-friendly habits that children bring home. In order to make teachings more engaging and relevant for students, this involves encouraging recycling, proper trash disposal, and responsible energy and water use. It also involves encouraging young people to become environmental activists and providing a local context for learning through the use of real-world, localized examples.

By putting these policies into place, the community ensures that the understanding and positive behavioral intentions fostered in the classroom lead to long-term, useful environmental action.

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