

Environmental Literacy, Ethical Engagement, And Green Practices of High School Students Toward a Sustainable Ecological Campus Management Plan

Cherry Joy S. Mago

Sacred Heart College of Lucena City, Inc., Lucena City, Philippines

magocherryjoy@gmail.com

Date Submitted:

March 18, 2026

Date Accepted:

June 21, 2026

Date Published:

August 12, 2026

DOI:

10.5281/zenodo.21899188

ABSTRACT

This study assessed the environmental literacy, ethical engagement, and green practices of high school students in a faith-based educational institution and used the findings to formulate a Sustainable Ecological Campus Management Plan (SECMP). The study employed descriptive-evaluative, descriptive-survey, and descriptive-developmental designs. A total of 510 students—276 junior high school and 234 senior high school students—were selected through stratified random sampling using Cochran-based sample-size calculations. Data were collected through a validated, self-developed and adapted questionnaire that was reviewed by three experts and pilot-tested prior to administration. Percentage ratings were used for environmental literacy, while weighted arithmetic means described ethical engagement and green practices. Students obtained an

overall environmental literacy average of 82.5%, with environmental concepts receiving the lowest score (66.4%), compared with the state of the environment (92.6%) and environmental issues and problems (88.6%). Ethical engagement was strongest in ecological responsibility (WAM = 3.25), followed by advocacy participation (WAM = 3.12) and community involvement (WAM = 2.95) in the detailed domain tables. Green practices were generally consistent, with energy conservation (WAM = 3.55), responsible water utilization (WAM = 3.39), and solid waste management (WAM = 3.30) rated Always, while sustainable transportation was rated Often (WAM = 3.24). The findings indicate strong environmental awareness and routine green behavior but continuing needs in conceptual understanding, sustained community participation, advocacy, and mobility-related practices. The proposed SECMP integrates experiential environmental learning, faith-based service, community partnerships, student advocacy, continuous monitoring, and targeted support for sustainable transportation to strengthen long-term ecological stewardship.

Keywords: *environmental literacy, ethical engagement, green practices, faith-based education, ecological stewardship, sustainable campus management*

INTRODUCTION

Environmental degradation, biodiversity loss, pollution, climate-related risks, and unsustainable resource use have intensified the need for education that develops not only environmental knowledge but also responsible values and behavior. Pooja (2024) identifies human-driven environmental degradation as a continuing global concern, while the United Nations (2015) situates environmental protection and sustainable development within the 2030 Agenda. In the Philippine context, Department of Education policies require environmental education to be integrated into school learning and co-curricular activities, emphasizing that schools are important settings for forming environmentally responsible citizens (Department of Education, 2011).

Environmental literacy is more than familiarity with environmental terms. Fang et al. (2022) describe it as a multidimensional capacity that combines environmental knowledge, competencies, dispositions, and action. However, empirical studies repeatedly show a gap between awareness and deeper conceptual understanding. Maulaa et al. (2020) reported moderate environmental literacy among junior high school students, while Wardani et al. (2024) likewise emphasized the need to strengthen students' understanding of ecological concepts. This knowledge–action gap becomes especially important when students can recognize visible environmental problems but have difficulty applying scientific principles to explain them or guide sustained action.

The source study was conducted in a PAASCU-accredited Catholic institution in Quezon Province that integrates environmental education with faith-based formation and participates in the Laudato Si' Action Plan. Despite existing school initiatives, the thesis documented practical sustainability concerns involving waste generation and segregation, unnecessary electricity use, and water wastage. These concerns suggested that environmental programs needed a clearer evidence base regarding what students understood, how strongly they viewed ecological care as an ethical responsibility, and how consistently they practiced sustainable behavior. Faith-based environmental education provides an additional dimension because ecological stewardship may be framed as both a scientific and moral responsibility (Altmeyer, 2021; Baring & Molino, 2021).

Accordingly, the study assessed students' environmental literacy in environmental concepts, state of the environment, and environmental issues and problems; examined ethical engagement in ecological responsibility, community involvement, and advocacy participation; evaluated green practices in solid waste management, energy conservation, responsible water utilization, and sustainable transportation; and used the findings to formulate a Sustainable Ecological Campus Management Plan. By integrating cognitive, ethical, behavioral, and institutional dimensions, the study contributes a school-based framework for strengthening environmental education and translating awareness into sustained ecological stewardship.

Literature Review

Environmental Literacy and Sustainability Education

Environmental literacy provides the cognitive foundation for informed environmental decision-making. Fang et al. (2022) conceptualize environmental literacy as an integration of knowledge, attitudes, skills, and responsible action, while Maurer and Bogner (2020) model environmental literacy through the interaction of environmental knowledge, values, and reported behavior. These perspectives support an educational approach that moves beyond recall of ecological terms toward the ability to interpret environmental conditions, evaluate problems, and use knowledge in practical situations. The source study operationalized this construct through environmental concepts, state of the environment, and environmental issues and problems.

Evidence from school settings indicates that environmental awareness may develop more quickly than conceptual mastery. Maulaa et al. (2020) found a predominantly moderate environmental literacy profile among seventh-grade learners, while Wardani et al. (2024) reported continuing weaknesses in high school students' environmental literacy. Mahinay et al. (2023), on the other hand, documented stronger environmental literacy among senior high school students, suggesting that exposure and educational progression may support higher awareness. Together, these studies indicate that sustainability education should combine conceptual learning with contextualized and experiential activities so that students can connect ecological principles with current environmental conditions.

Ethical Engagement and Faith-Based Ecological Stewardship

Environmental responsibility also involves values, moral judgment, and a willingness to act. In faith-based education, ecological stewardship may be understood as care for creation and responsibility for the common good. Pope Francis (2015) frames environmental care within integral ecology and calls for an ecological conversion that connects human relationships, justice, and care for the natural world. Baring and Molino (2021) likewise found an association between religious dispositions and environmental concern among Filipino youth,

while Altmeyer (2021) showed that religious education can strengthen a sense of stewardship in environmental decision-making.

Values-oriented environmental education becomes more meaningful when it leads to participation. Sarid and Goldman (2021) connect environmental citizenship with values and change agency, emphasizing that responsible action grows from both knowledge and commitment. Kalaycı Alas and Korutürk (2024) similarly highlight the potential of values education to strengthen sustainable environmental awareness and behavior. However, moral concern does not automatically produce sustained participation. Reutotar (2023) found that favorable awareness and attitudes toward stewardship may coexist with only moderate practice, reinforcing the need for structured service, leadership, and community engagement opportunities.

Green Practices and the Awareness–Action Gap

Green practices translate environmental literacy and ethical commitment into observable behavior. González-Viralta et al. (2023) describe green practices as actions that reduce environmental impact and support sustainable consumption. Within schools, these behaviors commonly include waste segregation and reduction, energy conservation, responsible water use, and sustainable mobility. Punzalan and Balanac (2020) demonstrate that participatory activities such as tree planting can strengthen environmental awareness and responsibility, indicating that practical, hands-on activities help bridge the distance between classroom learning and ecological action.

The consistency of green behavior is also shaped by environmental and institutional conditions. Zhang et al. (2023) found that water-use behavior is affected by awareness, perceived control, and social norms. In transportation, Lu et al. (2014) identified distance, road safety, and inadequate infrastructure as important barriers to active commuting, while Rivera (2023) similarly reported that transport choices are influenced by behavioral and infrastructure factors. These findings are important for school sustainability programs because some behaviors can be improved through education and routines, whereas others require structural support, partnerships, and enabling environments.

Whole-School Ecological Management and Student Participation

A sustainable school approach requires coordinated action across curriculum, policy, facilities, and participation. Bernal and Apdohan (2023) found that students may possess positive environmental attitudes while participating less consistently in environmental initiatives, suggesting that institutions must provide organized opportunities for involvement. Dissanayake (2024) likewise emphasizes that environmental literacy should connect knowledge with conservation-oriented action. These findings support school-wide approaches that combine environmental learning with participatory programs, monitoring, and visible institutional support.

School ecological management plans provide a mechanism for translating evidence into coordinated interventions. Rogayan and Nebrida (2019) used environmental awareness and practice data as input for an ecological management plan, demonstrating how school-level findings can guide sustainability priorities. Cruz and Tantengco (2017) similarly linked students' environmental awareness and practices with advocacy-oriented program development. In the present study, the SECMP functions as the applied output that integrates environmental concept development, faith-based service, community partnerships, student advocacy, and the reinforcement of established green practices while addressing areas constrained by access or infrastructure.

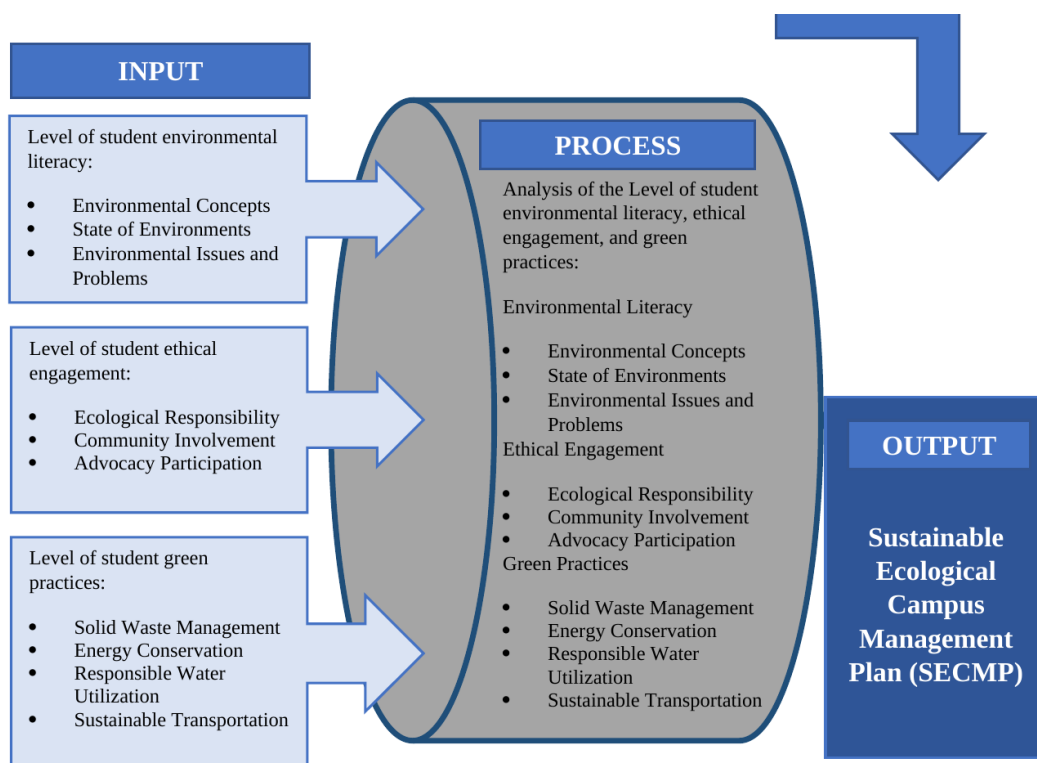


Figure 1. Conceptual paradigm of the study utilizing the Input–Process–Output model.

METHODS

Research Design

The study employed descriptive-evaluative, descriptive-survey, and descriptive-developmental research designs. The descriptive-evaluative component assessed environmental literacy in terms of environmental concepts, state of the environment, and environmental issues and problems. The descriptive-survey component described students' ethical engagement and green practices as they existed at the time of data collection. The descriptive-developmental component used the empirical findings as the basis for formulating the Sustainable Ecological Campus Management Plan. No variables were manipulated.

Research Locale

The study was conducted during School Year 2025–2026 in a PAASCU-accredited Catholic educational institution in Quezon Province. The institution provides education from Basic Education through Graduate School, holds Level III PAASCU accreditation, and participates in the Seven-Year Laudato Si' Action Plan. Its integration of ecological education, faith formation, and sustainability initiatives provided the contextual setting for examining students' environmental literacy, ethical engagement, and green practices.

Participants and Sampling Technique

Stratified random sampling was used. The detailed sample-size computations identified 276 junior high school students from a JHS population of 980 and 234 senior high school students from an SHS population of 631, yielding 510 respondents. Cochran's formula was applied using a 95% confidence level and 5% margin of error. Eligible respondents were enrolled junior or senior high school students, were willing to participate, and had parental or guardian consent. The sample was proportionally distributed across grade-level sections.

Research Instrument

Data were gathered using a self-developed and adapted questionnaire aligned with the study variables. Environmental literacy items measured environmental concepts, state of the environment, and environmental issues and problems and were interpreted using percentage-rating categories. Ethical engagement was measured through ecological responsibility, community involvement, and advocacy participation on a four-point scale, while green practices covered solid waste management, energy conservation, responsible water utilization, and sustainable transportation. Three validators with expertise in science, environmental education, and values education reviewed the instrument. The questionnaire was pilot-tested and subsequently checked by a statistician before full administration.

Data Gathering Procedure

After instrument validation and pilot testing, the researcher obtained approval from the oral examination committee and formal permission from the school principal. Because the respondents were minors, parental or guardian informed consent and student assent were secured before participation. Only students for whom both forms of agreement were obtained were included. The validated questionnaire was administered face-to-face, after which responses were retrieved, tabulated, and prepared for analysis.

Data Analysis

Environmental literacy was analyzed using percentage ratings based on the institution's statistical guide. Ratings of 90–100% were interpreted as Very Environmentally Literate, 80–89% as Environmentally Literate, 75–79% as Less Environmentally Literate, and below 75% as Least Environmentally Literate. Weighted arithmetic means were used for ethical engagement and green practices. For ethical engagement, 3.26–4.00 indicated Highly Engaged, 2.51–3.25 Engaged, 1.76–2.50 Occasionally Engaged, and 1.00–1.75 Not Engaged. For green practices, the corresponding categories were Always, Often, Seldom, and Never.

Ethical Consideration

Participation was voluntary. Respondents and their parents or guardians were informed about the study's purpose, procedures, expected participation, and right to withdraw. Confidentiality was maintained, responses were used only for scholarly purposes, and data were reported in aggregate form. The researcher also observed sensitivity in questionnaire wording and protected the rights, welfare, and dignity of the student participants throughout the research process.

RESULTS AND DISCUSSION

Environmental Literacy of High School Students

Table 1. *Summary of students' environmental literacy*

Domain	Average	Interpretation
Environmental concepts	66.4%	Least Environmentally Literate
State of the environment	92.6%	Very Environmentally Literate
Environmental issues and problems	88.6%	Environmentally Literate
Overall environmental literacy	82.5%	Environmentally Literate

Students were environmentally literate overall (82.5%), but the three components showed a pronounced difference. Environmental concepts had the lowest score at 66.4%, whereas awareness of the state of the environment reached 92.6% and environmental issues and problems reached 88.6%. This indicates that students were substantially more capable of recognizing current environmental conditions and widely discussed ecological problems than explaining the scientific concepts and systems that underlie them. The pattern is consistent with Maulaa et al. (2020) and Wardani et al. (2024), who documented continuing conceptual gaps in environmental literacy, and with Mahinay et al. (2023), who observed stronger environmental awareness among senior high school learners.

The result suggests that school campaigns, media exposure, and environmental programs may effectively heighten awareness, yet deeper learning still requires inquiry, systems thinking, and application. Fang et al. (2022) and Maurer and Bogner (2020) emphasize that environmental literacy is not limited to recognition of problems but includes understanding and action. For the SECMP, the low score in environmental concepts therefore became a priority for experiential, interdisciplinary, and problem-based learning linked to observable environmental conditions.

Ethical Engagement in Environmental Stewardship

Table 2. *Ethical engagement by domain*

Domain	WAM	Interpretation
Ecological responsibility	3.25	Engaged
Community involvement	2.95	Engaged
Advocacy participation	3.12	Engaged

The detailed domain tables placed all three dimensions of ethical engagement in the Engaged range. Ecological responsibility was strongest (WAM = 3.25), followed by advocacy participation (WAM = 3.12) and community involvement (WAM = 2.95). The highest individual indicator in ecological responsibility was reflection on how daily choices affect God's creation (WAM = 3.41), while active participation in conservation activities had the lowest domain indicator (WAM = 3.00). This contrast indicates that students strongly internalized environmental care as a personal and faith-based responsibility, but their participation in organized action was less consistent. This pattern supports the role of faith-based values described by Pope Francis (2015), Baring and Molino (2021), and Altmeyer (2021).

Community involvement was strongest for accessible school-based initiatives (WAM = 3.18) but lower for barangay and parish environmental activities (both WAM = 2.80). Advocacy participation similarly showed high support for Laudato Si' values (WAM = 3.33) but lower participation in formal environmental clubs (WAM = 2.79). Reutotar (2023) and Punzalan and Balanac (2020) likewise show that positive environmental values do not automatically lead to sustained collective participation. The findings therefore support structured service-learning, student leadership, parish and barangay partnerships, and stronger advocacy platforms within the SECMP.

Green Practices of High School Students

Table 3. *Summary of students' green practices*

Domain	WAM	Interpretation
Solid waste management	3.30	Always
Energy conservation	3.55	Always
Responsible water utilization	3.39	Always
Sustainable transportation	3.24	Often
Overall green practices	3.37	Always

Green practices were strong overall (WAM = 3.37, Always). Energy conservation received the highest domain mean (3.55), followed by responsible water utilization (3.39) and solid waste management (3.30). Specific strengths included avoiding unnecessary operation of computers (WAM = 3.64), immediately turning off faucets after use (WAM = 3.67), choosing reusable items (WAM = 3.42), and consistent waste segregation and mindful consumption. These behaviors suggest that practices supported by visible school policies, routines, and facilities had become relatively habitual. González-Viralta et al. (2023) and Zhang et al. (2023) similarly emphasize the importance of supportive norms and environments in sustaining green behavior.

Sustainable transportation was comparatively lower (WAM = 3.24, Often). Students strongly supported bike lanes and pedestrian zones (WAM = 3.60), yet walking or biking to school when distance was short received a lower WAM of 2.88. This indicates that willingness and environmental awareness were not sufficient when travel distance, road safety, and infrastructure constrained behavior. Similar barriers were identified by Lu et al. (2014) and Rivera (2023). Accordingly, the SECMP treats sustainable mobility as a shared institutional and

community concern that requires awareness activities together with partnerships for safer, more accessible transport options.

Sustainable Ecological Campus Management Plan

Table 4. Priority areas and core actions in the proposed SECMP

Priority area	Evidence from findings	Core proposed actions
Environmental concept development	Environmental concepts = 66.4%	Experiential and inquiry-based learning; environmental monitoring; problem-based and interdisciplinary activities
Community and faith-based engagement	Community involvement lower than personal responsibility	Faith-integrated service learning; community immersion; partnerships with barangays, parishes, and environmental organizations
Student advocacy and leadership	Formal club participation was comparatively low	Strengthen sustainability clubs; advocacy and leadership training; organized student-led campaigns
Waste, energy, and water practices	Domains rated Always	Continuous monitoring; student-led initiatives; recognition programs; waste audits and plastic-reduction activities
Sustainable transportation	Transportation = 3.24, Often	Walk-or-bike days; carpooling awareness; LGU partnerships for safer pedestrian and bike-friendly infrastructure

The SECMP was designed as the applied output of the study and directly reflects the areas of strength and need identified in the data. Its central strategy is to deepen conceptual environmental understanding while sustaining students' strong awareness of environmental conditions and problems. At the same time, it seeks to move ethical engagement from personal conviction toward sustained collective action through faith-integrated service, leadership, and community partnerships. Green practices that were already strong are maintained through monitoring and student-led initiatives, while sustainable transportation receives targeted behavioral and structural support. This evidence-to-action approach is consistent with school ecological planning advocated by Rogayan and Nebrida (2019) and with participatory environmental education described by Bernal and Apdohan (2023).

CONCLUSION

The study demonstrates that high school students in the faith-based school possessed substantial environmental awareness and generally strong green practices, but their performance was uneven across cognitive, ethical, and behavioral dimensions. Environmental literacy was strongest for awareness of the state of the environment and environmental issues and problems, while environmental concepts remained the clearest learning gap. Ethical engagement showed a stronger personal and faith-based orientation than sustained community participation and formal advocacy. Green practices were consistently observed in solid waste management, energy conservation, and responsible water utilization, whereas sustainable transportation was less consistently practiced because it was influenced by access, distance, safety, and infrastructure. These findings show that environmental education is most effective when knowledge, values, opportunities for participation, and supportive institutional conditions are developed together. The proposed Sustainable Ecological Campus Management Plan contributes an integrated school-level response by strengthening conceptual learning, faith-based stewardship, community involvement, student advocacy, and the institutionalization of everyday sustainable practices.

Recommendation

The school should strengthen environmental concept learning through inquiry-based, experiential, and interdisciplinary activities that connect ecological principles with actual campus and community conditions. Science and other teachers should integrate environmental monitoring, problem-solving, and reflective values formation into instruction. School leaders, the Laudato Si' coordinator, student organizations, parishes, barangays, and local environmental offices should provide regular service-learning, conservation, and advocacy opportunities so that students can translate faith-based responsibility into sustained collective action. Existing strengths in waste

segregation, energy conservation, and water stewardship should be maintained through continuous monitoring, student-led audits, recognition mechanisms, and visible school policies. Sustainable transportation initiatives should combine awareness campaigns with practical measures such as walk-or-bike days, carpooling promotion, and coordination with local government units for safer pedestrian and cycling infrastructure. Future studies may replicate the research in other faith-based and non-faith-based institutions, include family and community influences, and evaluate the effectiveness of the SECMP after implementation using longitudinal or mixed-methods designs.

References

- Altmeier, S. (2021). Religious education for ecological sustainability: An initial reality check using the example of everyday decision-making. *Journal of Religious Education*, 69(1), 57–74. <https://doi.org/10.1007/s40839-020-00131-5>
- Baring, R., & Molino, J. (2021). Environmental awareness, religious attitudes, and climate change: Preliminary considerations to youth dialogue on ecology. *The International Journal of Climate Change: Impacts and Responses*, 14(1), 149–163. <https://doi.org/10.18848/1835-7156/CGP/v14i01/149-163>
- Bernal, M. R., & Apdohan, C. G. (2023). Environmental and disaster risk reduction literacy among senior high school students in Sibagat, Agusan del Sur. *International Journal of Development, Education and Learning*, 3(2), 49–62. <https://doi.org/10.53824/ijddi.v3i2.49>
- Cruz, J. P., & Tantengco, N. S. (2017). Students' environmental awareness and practices: Basis for the development of an advocacy program. *MIMBAR PENDIDIKAN: Jurnal Indonesia untuk Kajian Pendidikan*, 2(1), 43–64. <https://ejournal.upi.edu/index.php/mimbardik/article/view/6022>
- Department of Education. (2011). DepEd Order No. 52, s. 2011: Strengthening environmental education in public and private schools. https://www.deped.gov.ph/wpcontent/uploads/2011/07/DO_s2011_52.pdf
- Dissanayake, D. M. S. B. (2024). Connecting the dots: Environmental literacy index in measuring knowledge for environmental conservation. *Proceedings of the International Forestry and Environment Symposium*. <https://doi.org/10.31357/fesympo.v27.7189>
- Fang, W., Hassan, A., & LePage, B. A. (2022). Environmental literacy. In *Sustainable development goals series* (pp. 93–126). Springer. https://doi.org/10.1007/978-981-19-4234-1_4
- González-Viralta, D., Veas-González, I., Egaña-Bruna, F., Vidal-Silva, C., Delgado-Bello, C., & Pezoa-Fuentes, C. (2023). Positive effects of green practices on consumers' satisfaction, loyalty, word-of-mouth, and willingness to pay. *Heliyon*, 9(10), e20353.
- Kalaycı Alas, D., & Korutürk, K. (2024). Exploring the impact of values education on sustainable environmental awareness and behavior among eighth-grade students. *Sustainability*, 16(21), 9302. <https://doi.org/10.3390/su16219302>
- Lu, W., McKyer, E. L. J., Lee, C., Goodson, P., Ory, M. G., & Wang, S. (2014). Perceived barriers to children's active commuting to school: A systematic review of empirical, methodological and theoretical evidence. *International Journal of Behavioral Nutrition and Physical Activity*, 11, Article 140. <https://doi.org/10.1186/s12966-014-0140-x>
- Mahinay, M. R., Nemenzo, M. C., & Lagria, R. C. (2023). Environmental literacy levels and environmental pollution among senior high school students. *Journal of Environmental Issues and Management Practices*.
- Maulaa, I., Hamidah, I., & Permanasari, A. (2020). Environmental literacy profile of 7th grade junior high students in science learning on global warming subject. *Journal of Physics: Conference Series*, 1521(4), 042122. <https://doi.org/10.1088/1742-6596/1521/4/042122>
- Maurer, M., & Bogner, F. X. (2020). Modelling environmental literacy with environmental knowledge, values, and (reported) behaviour. *Studies in Educational Evaluation*, 65, 100863. <https://doi.org/10.1016/j.stueduc.2020.100863>
- Pooja, P. (2024). Environmental degradation: Causes, impacts and mitigation. *Journal of Advances in Science and Technology*, 20(1), 220–223. <https://doi.org/10.29070/94vmdz61>
- Pope Francis. (2015). *Laudato Si': On care for our common home*. Libreria Editrice Vaticana. https://www.vatican.va/content/francesco/en/encyclicals/documents/papafrancesco_20150524_enciclica-laudato-si.html
- Punzalan, E. R., & Balanac, D. R. (2020). Students' participation in tree planting activity: Promoting the 21st century environmental education. *Asia Pacific Journal of Multidisciplinary Research*, 8(2), 32–41.
- Reutotar, J. B. (2023). Awareness, attitude and practices of Grade 10 students toward environmental stewardship. *International Journal of Multidisciplinary: Applied Business and Education Research*, 4(10), 3549–3558. <https://doi.org/10.11594/ijmaber.04.10.12>

- Rivera, Y. K. P. (2023). Determinants for modal shift of school children from private vehicles to public transport: A case study in Metro Manila, Philippines. *Proceedings of the 28th Annual Conference of the Transportation Science Society of the Philippines*, 15(1), 760–778. https://ncts.upd.edu.ph/tssp/wp-content/uploads/2023/01/TSSP2022_12.pdf
- Rogayan, D., & Nebida, E. (2019). Environmental awareness and practices of science students: Input for ecological management plan, 9, 106–119.
- Sarid, A., & Goldman, D. (2021). A value-based framework connecting environmental citizenship and change agents for sustainability—Implications for education for environmental citizenship. *Sustainability*, 13(8), 4338. <https://doi.org/10.3390/su13084338>
- United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. <https://sdgs.un.org/goals>
- Wardani, R. A. K., Karyanto, P., & Ramli, M. (2024). Analysis of high school students' environmental literacy. *Journal of Physics: Conference Series*, 1022(1), 012057. <https://doi.org/10.1088/1742-6596/1022/1/012057>
- Zhang, L., Wang, S., Zhou, Y., & Chen, Y. (2023). Mechanism of water use behavior of college students. *Processes*, 11(2), 643. <https://www.mdpi.com/2227-9717/11/2/643>