Navigating Environmental Stewardship: Assessing the Coastal Clean-Up Initiatives to Maritime Students in a University

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ABSTRACT

The increasing of environmental pollution caused by excessive waste, particularly marine litter dominated by plastics, has emerged as a pressing global concern that threatens coastal and aquatic ecosystems. This study underscores the importance of embedding environmental education within maritime programs, recognizing both the ecological and psychological consequences of polluted coastal environments, and fostering environmental awareness among future maritime professionals. Effective and sustainable strategy entails the establishment of volunteer-driven coastal clean-up programs, which not only address marine pollution but also promote environmental consciousness, civic engagement, and a collective sense of social responsibility within the community. This study employed a descriptive quantitative research

design to determine the university-led coastal clean-up activities on maritime students' development in terms of knowledge, skills, values, and attitudes. Data were collected through a Google Forms survey disseminated via Facebook Messenger and e-mail, using purposive sampling to identify eligible participants and random sampling for distribution. Ethical standards, including anonymity and confidentiality of responses, were strictly observed. Findings reveal that coastal clean-up initiatives serve as effective experiential learning strategies, significantly enhancing students' environmental literacy, teamwork and leadership skills, and values-based education. These activities provide practical learning opportunities that complement classroom instruction, preparing maritime students with the competencies, ethics, and sense of stewardship needed to become responsible leaders in both the community and the maritime industry.

INTRODUCTION

The rising environmental deterioration caused by excessive waste has become a primary global concern, posing enormous challenges at both local and international levels. Marine environments, in particular, face severe threats from pollution, flooding, and waste accumulation, which not only damage ecosystems but also endanger livelihoods, infrastructure, and human lives (Montebon et al., 2025). In response, governments, institutions, and organizations have implemented various waste management practices and sustainability initiatives. Yet, the escalating marine waste crisis underscores the urgent need for more proactive, education-driven solutions that address both environmental protection and human development. This urgency is further magnified in communities affected by rapid urbanization, where weak infrastructure and inadequate basic services heighten vulnerability to disasters such as flooding, amplifying both environmental and social risks (Montebon et al., 2024).

The 2030 Agenda for Sustainable Development highlights the crucial role of education in advancing sustainability. Adopted in 2015, this framework includes 17 Sustainable Development Goals (SDGs) and 169 targets, with SDG 4 (Quality Education) and SDG 14 (Life Below Water) addressing critical environmental and educational concerns. Specifically, Target 4.7 calls for equipping individuals with knowledge and skills for sustainable development, while Target 14.1 aims to reduce marine pollution by 2025 significantly (Nations, 2015).

The sea is an integral part of Earth's ecosystem, providing habitat for millions of organisms (Liu et al., 2017). Conserving marine ecosystems demands long-term stewardship, and young people have a significant role to play. Environmentally literate and empowered youth can force change towards

sustainable environmental conservation. Thus, environmental education that inculcates awareness and advocacy is paramount in empowering them with a bigger voice on environmental matters (Erhabor, 2022).

According to Bettencourt et al. (2023), one of the most pressing global environmental issues is marine litter, predominantly plastic waste. Marine litter has been recognized as one of the most widespread and rapidly increasing anthropogenic threats to coastal and marine ecosystems (Rangel-Buitrago et al., 2022). Without immediate intervention, the volume of plastic waste entering aquatic environments is projected to triple by 2040 (McGlade et al., 2021). While essential to global trade and transportation, the maritime industry significantly contributes to this crisis (IMO, 2021).

A study by Wyles et al. (2016) identified that littered coastal environments, especially those including public trash like food packaging, were highly disliked. Such pollution was linked to sadness and a decrease in the environment's restorative potential relative to cleaner coastal environments. Wyles et al. (2017) state that coast visits can have psychological and environmental impacts. A means of overcoming environmental issues is volunteer coastal clean-ups, although they may only benefit the immediate locations.
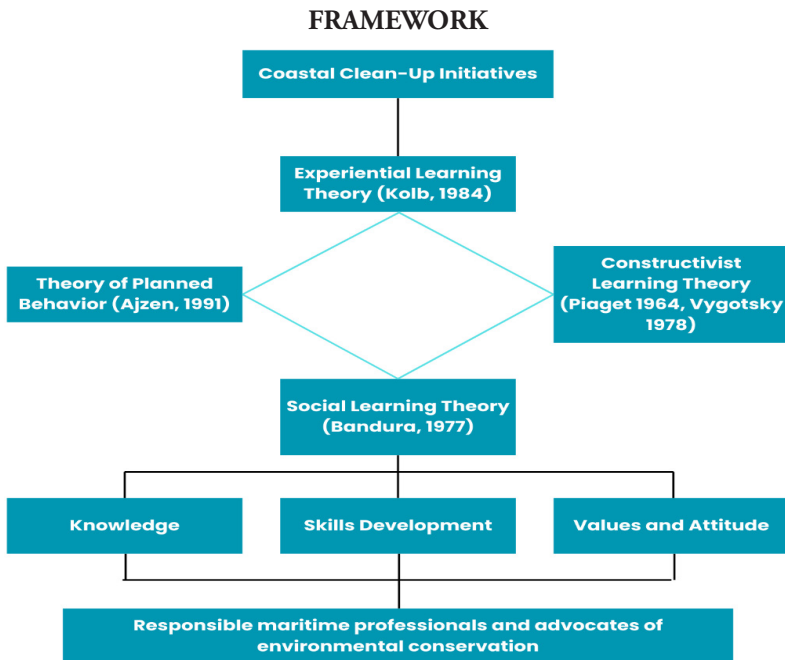
Given these challenges, integrating environmental education into maritime programs is essential (European Maritime Safety Agency [EMSA], 2022). Hands-on learning experiences and sustainability-focused initiatives empower individuals to take responsibility for environmental conservation and contribute to long-term sustainability efforts. Community service further strengthens these initiatives by fostering collaborative relationships, promoting social progress, and improving living conditions in disadvantaged areas (Montebon et al., 2024).

A key factor to consider in maintaining environmental sustainability is the cultivation of an attitude of concern for the environment. This empathetic thinking also influences an individual's intention to protect and preserve the environment. The detrimental impacts of environmental damage are numerous and diverse, such as air pollution, river and marine air ecosystems, and damage to the agricultural sector caused by mining (Haris, 2016).

According to research findings, desire is the most important component determining actual environmental protection behavior (Wang et al., 2019). An environmentally conscious mindset continually attempts to anticipate environmental harm and develop actions to reduce existing harm (Purwanti, 2017). Environmental welfare refers to the obligation of all communities to conserve, manage, and preserve their surroundings. Citizenship is a notion that significantly impacts many sectors, including economics, legislation, philosophy, business management, marketing, and education (Hadjichambis & Reis, 2020).

One practical approach to tackling marine pollution is volunteer-led clean-ups, which have emerged as an important environmental stewardship practice. These initiatives enable coastal communities to reduce pollution and preserve shorelines proactively. Beyond the immediate waste reduction benefits, such programs cultivate a culture of environmental responsibility and community engagement in the fight against marine pollution. Engaging academic institutions and local organizations in these efforts benefits communities and instills strong ethical and environmental values in students and volunteers participating in community extension programs (Montebon et al., 2022).

Lack of environmental knowledge and awareness, including littering, all result from a lack of appropriate facilities (Mardiana et al., 2019). An ecological crisis occurs in society due to a lack of information and awareness regarding environmental protection, particularly in urban areas. The reasons for today's environmental concerns are entirely attributable to residents' attitudes that endanger their lives (Siagian et al., 2023). Raising awareness among people about the need to protect and preserve the environment is a critical effort that must be undertaken promptly (Elmy & Winarso, 2020).

FRAMEWORK

Coastal Clean-Up Initiatives

Experiential Learning Theory (Kolb, 1984)

Theory of Planned Behavior (Ajzen, 1991)

Constructivist Learning Theory (Piaget 1964, Vygotsky 1978)

Social Learning Theory (Bandura, 1977)

Knowledge

Skills Development

Values and Attitude

Responsible maritime professionals and advocates of environmental conservation

Experiential Learning Theory (Kolb, 1984) emphasizes learning as a cyclical process of concrete experience, reflective observation, abstract conceptualization, and active experimentation, where knowledge is built through the transformation of direct experiences into concepts that guide future action. Recent studies highlight its application in marine and environmental education: Owens (2018) demonstrated that experiential marine-debris clean-up activities significantly enhance learning outcomes and stewardship behaviors, while Hung et al. (2023) applied Kolb's cycle in a beach clean-up curriculum, showing how participants' knowledge and reflective practices deepened their environmental understanding. Similarly, Townley et al. (2024) found that outdoor learning activities in higher education foster measurable knowledge gains and positive shifts in environmental attitudes. Therefore, in the context of maritime students' coastal clean-up drives, this theory directly supports the development of knowledge through hands-on observation of marine litter and its impacts, skills via teamwork, data collection, sorting, and leadership roles during clean-ups, and values and attitudes through reflection that nurtures responsibility, pro-environmental commitment, and sustainable behaviors.

In addition, the Theory of Planned Behavior (Ajzen, 1991) posits that behavioral intention—the strongest predictor of actual behavior—is shaped by attitudes toward the behavior, subjective norms, and perceived behavioral control (PBC). Recent studies extend its application to environmental and marine litter contexts: Bosnjak et al. (2020) confirmed TPB's robustness across diverse domains, including pro-environmental actions; Botetzagias et al. (2015) demonstrated how integrating moral norms enhances prediction of conservation behaviors; and Gancar et al. (2018) applied an extended TPB framework to beach litter prevention, highlighting the role of values and norms in driving litter-prevention intentions. Thus, in the case of maritime students' coastal clean-up drives, knowledge about marine litter deepens understanding of its ecological consequences, strengthening positive attitudes toward participation; skills development enhances PBC, as students gain competence in sorting, recording, and managing debris, which increases confidence and willingness to engage in future clean-ups; and values and attitudes are reinforced by subjective norms, as peer and institutional support normalize participation while moral norms cultivate a sense of responsibility, thereby amplifying pro-environmental intentions and behaviors.

Moreover, Constructivist Learning Theory, rooted in the works of Piaget (2003) and Vygotsky (1978), posits that learners actively construct knowledge through contextualized experiences and social interaction, with learning enhanced through scaffolding and collaborative engagement. Recent scholarship

emphasizes its relevance to environmental and outdoor education: Arik (2020) demonstrated through a meta-analysis that constructivist and active learning approaches significantly improve conceptual understanding and metacognitive skills, while Townley et al. (2024) confirmed that outdoor, community-based learning fosters deeper comprehension and transferable competencies. Consequently, applied to maritime students' coastal clean-up drives, this theory underscores how knowledge is actively built as students investigate real-world issues such as classifying marine debris and tracing pollution sources; skills development emerges as facilitators scaffold tasks in data collection, leadership, and teamwork, enabling the internalization of procedural and collaborative skills; and values and attitudes are strengthened through reflective dialogue and social negotiation with peers and communities, fostering stewardship and pro-environmental responsibility grounded in meaningful personal and collective experiences.

Finally, Social Learning Theory (Bandura & Walters, 1977) explains that individuals acquire new behaviors through observing and imitating role models such as peers, teachers, or community leaders—mediated by attention, retention, reproduction, and motivation, with self-efficacy serving as a key driver of translating observation into action. Recent research confirms its applicability to environmental engagement: Wichmann et al. (2022) showed that citizen science and participatory monitoring, including beach sampling, foster pro-environmental behaviors among youth through modeling and group participation; Purba et al. (2023) identified community role models and social mobilization as critical in sustaining coastal clean-up involvement in Southeast Asia; and Adam (2021) highlighted how visible leadership and social influence significantly enhance participation in beach clean-ups. Accordingly, in the maritime student context, knowledge is reinforced when learners observe and replicate proper waste classification and environmental practices; skills development is strengthened by modeling teamwork, leadership, and procedural tasks during clean-ups; and values and attitudes are shaped as students internalize stewardship behaviors modeled by peers and community leaders, ultimately building stronger self-efficacy and commitment to pro-environmental action.

OBJECTIVE OF THE STUDY

This study aims to determine the coastal clean-up initiatives on maritime students, particularly in the context of community engagement programs that promote sustainability and marine conservation. It specifically seeks to determine how these initiatives influence students' knowledge, skills development, and

values and attitudes, highlighting their role in fostering environmental awareness, leadership, and civic responsibility. By assessing these variables, the research intends to provide insights into how academic institutions can effectively integrate experiential learning activities into maritime education, thereby strengthening sustainability efforts and developing responsible maritime professionals who will serve as advocates of environmental conservation throughout their careers.

METHODOLOGY

Research Design

The study was conducted among maritime students who actively participated in the coastal clean-up initiatives organized by the University, as they were considered the most appropriate respondents for evaluating the program's impact. Adopting a descriptive quantitative research design, the study employed a structured survey administered through Google Forms to measure the effects of the coastal clean-up activities on students' knowledge, skills development, values, and attitudes. A two-step sampling procedure was applied: purposive sampling was used to identify qualified participants those who took part in the clean-up while random sampling guided the distribution of the survey link through Facebook Messenger and e-mail, ensuring fairness and equal opportunity for participation. Data collection was limited to the number of completed responses, which were subsequently analyzed and interpreted. Ethical considerations were strictly observed throughout the research process, with respondents' identities kept anonymous and all information treated with the highest degree of confidentiality to ensure that the data was used solely for academic purposes.

Respondents

The respondents of this study were five hundred forty-four (544) maritime students enrolled at the University who actively participated in the institutional coastal clean-up programs. They were chosen as the primary participants because their direct involvement in the activity provided first-hand insights into how experiential, social, and environmental engagement could influence their academic and personal development. Participation was limited to those with verifiable involvement in at least one of the coastal clean-up activities. This focus ensured that the responses reflected authentic experiences and perspectives relevant to the study's objectives.

Instrumentation

The main instrument used in this study was a researcher-made structured

survey questionnaire administered through Google Forms, which allowed for efficient distribution and accessibility among respondents. The questionnaire comprised three sections aligned with the research variables: knowledge, skills development, and values and attitudes. Each section included closed-ended questions measured on a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree.

To ensure the accuracy and consistency of the research instrument, both content validity and reliability tests were conducted. The Content Validity Index (CVI) was assessed by a panel of experts in maritime education and community extension, who evaluated each item based on its clarity, relevance, and representativeness. The feedback provided was incorporated to refine the instrument accordingly. Furthermore, the reliability analysis yielded a Cronbach's alpha (α) coefficient of 0.935, which indicates excellent internal consistency, thereby confirming that the items were highly reliable and consistently measured the intended constructs. Overall, these results affirm that the research instrument is both valid and reliable for assessing maritime students' engagement and perceptions of environmental stewardship through coastal clean-up activities.

Data Gathering Procedure

Data collection followed a two-step sampling procedure. First, purposive sampling was employed to identify qualified respondents, specifically, maritime students who had participated in the clean-up drives. Second, simple random sampling was utilized in distributing the survey link to ensure fairness, equal opportunity for participation, and the minimization of bias. The survey was distributed via e-mail and Facebook Messenger, considering the accessibility of these platforms to the target respondents. Data collection was limited to the number of completed responses within the given time frame. After submission, responses were tabulated, organized, and prepared for statistical analysis.

Research Ethics Protocol

The study adhered to ethical research standards throughout the process. Respondents were informed of the study's objectives and assured that their participation was voluntary, with the option to withdraw at any point. Informed consent was embedded in the survey form prior to answering the questionnaire. Confidentiality was ensured by anonymizing all responses, and no personally identifiable information was collected. All data were stored securely and used solely for academic purposes. Approval for conducting the study was sought from the University's research ethics committee prior to implementation, with protocol approval of the Faculty (3)-2025-08-28.

Statistical Analysis

The collected data were analyzed using descriptive statistical techniques to discern central trends and response consistency. In particular, the weighted mean was employed to capture the average orientation of responses across the principal research variables (knowledge, skills development, and values and attitudes), thus reflecting the relative weight of each item in the overall measure. This approach aligns with contemporary survey-based educational research that interprets weighted means as representative averages for Likert-scale responses (Cervantes et al., 2022).

RESULTS AND DISCUSSION

Table 1

Coastal Clean-Up Initiatives on Maritime Students in Terms of Knowledge

Indicators	Mean	Interpretation
I have gained a deeper understanding of the importance of environmental preservation.	4.63	Strongly Agree
I have learned the significance of proper waste segregation.	4.62	Strongly Agree
I now have a better understanding of the needs of the community.	4.61	Strongly Agree
I have discovered the genuine significance and benefits of volunteering.	4.59	Strongly Agree
I fully comprehend the purpose of participating in community development initiatives in addressing environmental issues.	4.58	Strongly Agree
I have acquired additional knowledge related to environmental conservation.	4.58	Strongly Agree
I have developed resilience and a greater willingness to contribute to the improvement of my surroundings.	4.59	Strongly Agree
Grand Mean	4.60	Strongly Agree

Table 1 presents the effects of coastal clean-up initiatives in terms of knowledge; as observed, the highest indicator pertains to gaining a deeper understanding of the importance of environmental preservation, with a mean of 4.63; this means that the activity successfully promoted the participants' core values on environmental stewardship.

In addition, the maritime students recognize the positive impact of coastal

clean-up initiatives on their environmental knowledge, with a grand mean of 4.60, interpreted as strongly agree; this indicates that the maritime students extensively agree that their involvement in coastal clean-up activities has improved their knowledge and awareness of the environmental and community-related concerns.

This aligns with the study's findings by Chen (2015), who states that awareness-raising and education campaigns can be employed to control behaviors; hence, mobilizing individuals may significantly impact marine debris reduction. The promotion of critical thinking is also the aim of education. It is a competence-based, transformational, and holistic education that emphasizes learning rather than teaching in a learner-centered model of teaching (Rieckmann, 2018).

Table 2

Coastal Clean-Up Initiatives to Maritime Students in terms of Skills Development

Indicators	Mean	Interpretation
I have improved my ability to work effectively as part of a team.	4.60	Strongly Agree
I have developed practical skills that are useful in community engagement activities.	4.57	Strongly Agree
I have enhanced my communication skills in interacting with organizers, volunteers, and stakeholders.	4.54	Strongly Agree
I have improved my ability to make quick decisions and sound judgments during the activity.	4.54	Strongly Agree
I have acquired effective networking and collaboration skills.	4.53	Strongly Agree
I have strengthened my leadership, critical thinking, and problem-solving abilities.	4.53	Strongly Agree
I have expanded my professional and social connections with various individuals and organizations.	4.54	Strongly Agree
Grand Mean	4.55	Strongly Agree

Table 2 shows the effects of coastal clean-up initiatives on skills development, as reflected in the highest indicators about improvement of the ability to work effectively as part of a team, with a mean of 4.60 interpreted as strongly agree. It reflects the importance of teamwork and group work in such community extension efforts, which are especially important in the maritime sector where

coordination of crews is essential.

The grand mean of 4.55, wherein all the items are considered as "Strongly Agree," shows that the coastal clean-up program has produced a powerful positive effect on acquiring different skills among maritime students. The program exceeds environmental education as it develops the capabilities needed for personal development and future employability.

Britton et al. (2027) state that practical teamwork skills are essential for success in an increasingly team-based workplace. Collaborating with others within or beyond the field is acknowledged as applicable to the quality and effectiveness of work. Educational institutions have responded to this phenomenon by stimulating students to collaborate while training (Tessier, 2021).

Table 3

Coastal Clean-Up Initiatives to Maritime Students in terms of Values and Attitude

Indicators	Mean	Interpretation
I feel more empowered to take an active role in solving community problems.	4.51	Strongly Agree
I recognize the importance of setting a good example for others.	4.55	Strongly Agree
I have developed a greater sense of discipline and responsibility.	4.58	Strongly Agree
I have become more aware and concerned about environmental issues.	4.57	Strongly Agree
I have cultivated a stronger spirit of volunteerism.	4.54	Strongly Agree
I have developed a deeper appreciation for the value of service to the community.	4.57	Strongly Agree
I have realized the importance of contributing to the well-being of others as a way to live a meaningful life.	4.59	Strongly Agree
Grand Mean	4.56	Strongly Agree

Table 3 shows the effects of coastal clean-up initiatives on values and attitude; the highest mean is 4.59 with the indicator "I have realized the importance of contributing to the wellbeing of others as a way to live a meaningful life." It

represents a high internalization of civic duty and compassion. This indicates that the activity facilitated students relating their actions to a larger sense of purpose and community involvement.

The grand mean of 4.56, with all the indicators, reflected as "Strongly Agree," indicates that the coastal clean-up program has significantly and positively influenced maritime students' values formation and attitudinal growth. It validates that involvement in such activities supports personal and ethical development, increasing the commitment to environmental and community service.

The study of George et al. (2017) emphasizes that community-based activity could provide students with sufficient service learning experience. Engagement in the university community extension services will allow students to progress in their careers, and their experience will be more beneficial in their future practice (Montebon et al., 2023)

CONCLUSIONS

The study affirms that coastal clean-up activities serve as highly effective experiential learning exercises, contributing significantly to the academic and personal development of maritime students. Anchored on Kolb's Experiential Learning Theory (1984), the findings emphasize that active participation in real-world environmental initiatives enables students to transform direct experiences into meaningful learning, reinforcing theoretical concepts through reflection and application.

Furthermore, the study aligns with Ajzen's Theory of Planned Behavior (1991), as the coastal clean-up initiatives positively shape students' attitudes, perceived behavioral control, and intentions toward environmental stewardship and social responsibility—key predictors of sustained pro-environmental behavior. Through the lens of the Constructivist Learning Theory, the program facilitates knowledge construction as students engage in collaborative problem-solving, critical thinking, and community-based action, allowing them to internalize values essential to maritime and environmental ethics.

In addition, consistent with Bandura's Social Learning Theory (1977), students' participation in these initiatives allows them to observe, model, and emulate environmentally responsible behaviors from peers, mentors, and community leaders, thereby reinforcing their own commitment to sustainability.

Overall, the study concludes that coastal clean-up activities are powerful platforms for values-based and experiential education, enabling maritime students to develop not only environmental knowledge and awareness but also the ethical grounding, interpersonal competence, and leadership qualities necessary for

responsible participation in both the community and the maritime industry.

TRANSLATIONAL RESEARCH

The findings of this study hold significant translational value as they demonstrate how volunteer-driven coastal clean-up initiatives can be effectively integrated into maritime education to strengthen environmental stewardship and professional formation. By linking community engagement with academic instruction, the research provides a model for transforming experiential activities into structured learning strategies that enhance knowledge, skills, values, and attitudes essential for future maritime professionals. Beyond the university, the insights can guide policymakers, local governments, and environmental organizations in designing collaborative programs that not only mitigate marine pollution but also foster youth leadership and civic responsibility. Thus, this study bridges theory and practice by offering actionable frameworks that educational institutions and partner communities can adopt to cultivate sustainable behaviors and long-term ecological responsibility.

LITERATURE CITED

Adam, I. (2021). Tourists' perception of beach litter and willingness to participate in beach clean-up. *Marine Pollution Bulletin*, *170*, 112591. https://doi.org/10.1016/j.marpolbul.2021.112591

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1, pp. 141-154). Englewood Cliffs, NJ: Prentice hall. https://www.asecib.ase.ro/mps/Bandura_SocialLearningTheory.pdf

Bettencourt, S., Freitas, D. N., Lucas, C., Costa, S., & Caeiro, S. (2023). Marine litter education: From awareness to action. *Marine Pollution Bulletin*, *192*, 114963.

Bosnjak, M., Ajzen, I., & Schmidt, P. (2020). The theory of planned behavior: Selected recent advances and applications. *Europe's journal of psychology*, *16*(3), 352. doi: 10.5964/ejop.v16i3.3107

Botetzagias, I., Dima, A. F., & Malesios, C. (2015). Extending the theory of planned behavior in the context of recycling: The role of moral norms and of demographic predictors. *Resources, conservation and recycling*, *95*, 58-67. https://doi.org/10.1016/j.resconrec.2014.12.004

Britton, E., Simper, N., Leger, A., & Stephenson, J. (2017). Assessing teamwork in undergraduate education: a measurement tool to evaluate individual teamwork skills. *Assessment & Evaluation in Higher Education*, *42*(3), 378-397. https://doi.org/10.1080/02602938.2015.1116497

Cervantes, K. T., Magno, M. T., & Monto Jr, J. (2022). A Descriptive Study on Class Size toward Senior High School Students' Evaluation of Robotics Teachers. *Online Submission*. https://eric.ed.gov/?id=ED625380

Chen, C. L. (2015). Regulation and management of marine litter. In *Marine anthropogenic litter* (pp. 395-428). Cham: Springer International Publishing.

Elmy, M., & Winarso, H. P. (2020). Kepedulian Orang Tua dalam Menanamkan Karakter Peduli Lingkungan (Studi terhadap Warga di Bantaran Sungai Kuin Kota Banjarmasin). In *Prosiding Seminar Nasional Lingkungan Lahan Basah* (Vol. 5, No. 1, pp. 88-92). https://snllb.ulm.ac.id/prosiding/index.php/snllb-lit/article/view/326

Erhabor, N. (2022). Impact of environmental education on the knowledge and attitude of students towards the environment. *Tạp chí Nghiên cứu dân tộc*. https://tinyurl.com/58uyyvbn

European Maritime Safety Agency (EMSA). (2022). Annual review on environmental performance in maritime education. EMSA Publications. Retrieved from https://www.emsa.europa.eu

Gancar, C. P., Fenitra, R. M., Masmira, K., Sedera, R. M. H., & Abbas, A. (2018). Extended Theory of Planned Behavior and Environmentally Responsible Behavior in the Context of Beach Tourism. *Malaysian Journal of Consumer and Family Economics*.

George, C. L., Wood-Kanupka, J., & Oriel, K. N. (2017). Impact of participation in community-based research among undergraduate and graduate students. *Journal of Allied Health*, *46*(1), 15E-24E. https://www.ingentaconnect.com/content/asahp/jah/2017/00000046/00000001/art00012

Hadjichambis, A. C., & Reis, P. (2020). Introduction to the conceptualisation of environmental citizenship for twenty-first-century education. In *Conceptualizing environmental citizenship for 21st century education* (pp. 1-14). Cham: Springer International Publishing. https://library.oapen.org/bitstream/handle/20.500.12657/39551/2020_Book_ConceptualizingEnvironmentalCi.pdf#page=13

Haris, A. M., & Purnomo, E. P. (2016). Implementasi CSR (Corporate Social Responsibility) PT. Agung Perdana Dalam Mengurangi Dampak Kerusakan Lingkungan. *Journal of Governance and Public Policy*, *3*(2), 203-225. DOI: https://doi.org/10.18196/jgpp.v3i2.2627

Hung, L. Y., Wang, S. M., & Yeh, T. K. (2023). Kolb's experiential learning theory and marine debris education: Effects of different stages on learning. *Marine Pollution Bulletin*, *191*, 114933. https://doi.org/10.1016/j.marpolbul.2023.114933

International Maritime Organization (IMO). (2021). MARPOL: Regulations for the prevention of marine pollution. IMO Publications. Retrieved from https://www.imo.org

Liu, B., Xu, M., Wang, J., & Xie, S. (2017). Regional disparities in China's marine economy. *Marine Policy*, *82*, 1-7. https://doi.org/10.1016/j.marpol.2017.04.015

Mardiana, S., Berthanilla, R., Marthalena, M., & Rasyid, M. R. (2019). Peningkatan pengetahuan masyarakat mengenai pengelolaan pembuangan dan pemilahan sampah rumah tangga di Kelurahan Kaligandu Kota Serang. *Bantenese-Jurnal Pengabdian Masyarakat*, *1*(2), 79-88.

McGlade, J., Samy Fahim, I., Green, D., Landrigan, P., Andrady, A., Costa, M., ... & Turra, A. (2021). From pollution to solution: A global assessment of marine litter and plastic pollution. https://nottingham-repository.worktribe.com/output/8047115

Montebon, R. L., Bachanicha, R. M., Lopez, M. T., & Ocariza, R. D. P. AGPE THE ROYAL GONDWANA RESEARCH JOURNAL.

Montebon, R. L., Monton, M. T., Cuerda, A. D., & Flores, F. H. Y. European Journal of Science, Innovation and Technology. *European Journal of Science, Innovation and Technology, 4(*1), 93-98. https://www.ejsitjournal.com/index.php/ejsit/article/view/365.

Montebon, R. L., Monton, M. T., Cuerda, A. D., & Flores, F. H. Y. (2024) Community Participation of Villages in Urban Flooding. *European Journal of Science, Innovation and Technology, (4)* 1, 315-322. https://tinyurl.com/35c2haym.

Montebon, R., Amparado, M. A., & Son, A. L. (2025). Participatory Groups in Urban Flooding: The Case of Mandaue City, Cebu, Philippines. *JPAIR Multidisciplinary Research, 60*(1), 175-190. DOI: https://doi.org/10.7719/jpair.v60i1.935

Montebon, R., Bachanicha, R., Monton, M., Engkong, J. C., & Labana, A. (2022). Community Extension Profiling of the Teaching and Non-teaching Personnel of the University. *JPAIR Multidisciplinary Research, 50*(1), 1-12. DOI: https://doi.org/10.7719/jpair.v50i1.442

Nations, U. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development United Nations.

Owens, K. A. (2018). Using experiential marine debris education to make an impact: Collecting debris, informing policy makers, and influencing students. *Marine pollution bulletin*, *127*, 804-810. https://doi.org/10.1016/j.marpolbul.2017.10.004

Piaget, J. (2003). Part I: Cognitive Development in Children--Piaget Development and Learning. *Journal of research in science teaching*, *40*. https://eric.ed.gov/?id=ej773455

Purba, N. P., Pasaribu, B., Faizal, I., Martasuganda, M. K., Ilmi, M. H., Febriani, C., & Alfarez, R. R. (2023). Coastal clean-up in Southeast Asia: lessons learned, challenges, and future strategies. *Frontiers in Marine Science*, *10*, 1250736. https://doi.org/10.3389/fmars.2023.1250736

Purwanti, D. (2017). Pendidikan karakter peduli lingkungan dan implementasinya. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, *1*(2). DOI: https://doi.org/10.20961/jdc.v1i2.17622

Rangel-Buitrago, N., Williams, A., Costa, M. F., & de Jonge, V. (2020). Curbing the inexorable rising in marine litter: An overview. *Ocean & Coastal Management*, *188*, 105133. https://doi.org/10.1016/j.ocecoaman.2020.105133

Rieckmann, M. (2018). Learning to transform the world: Key competencies in Education for Sustainable Development. *Issues and trends in education for sustainable development*, *39*(1), 39-59.

Siagian, N., Ridayani, Andrias, Kamsinah, Maryanti, E., Fatmawati, E., ... & Fajri, I. (2023). The effect of environmental citizenship and spiritual norms as mediators on students' environmental behaviour. *International Journal of Adolescence and Youth*, *28*(1), 2231511. https://doi.org/10.1080/02673843.2023.2231511

Tessier, V. (2021). A model for learning teamwork skills. In *DS 110: Proceedings of the 23rd International Conference on Engineering and Product Design Education (E&PDE 2021), VIA Design, VIA University in Herning, Denmark. 9th-10th September 2021.* https://www.designsociety.org/publication/43469/a_model_for_learning_teamwork_skills

Townley, C. T., Martinez, M. E., & Clark, B. A. (2024). Outdoor Learning at US Higher Education Institutions: A Systematic Review of Research—1996 to 2020. *SAGE Open*, *14*(4), 21582440241296784. https://doi.org/10.1177/21582440241296784

Wang, Y., Liang, J., Yang, J., Ma, X., Li, X., Wu, J., ... & Feng, Y. (2019). Analysis of the environmental behavior of farmers for non-point source pollution control and management: An integration of the theory of planned behavior and the protection motivation theory. *Journal of environmental management*, *237*, 15-23. https://doi.org/10.1016/j.jenvman.2019.02.070

Wichmann, C. S., Fischer, D., Geiger, S. M., Honorato-Zimmer, D., Knickmeier, K., Kruse, K., ... & Thiel, M. (2022). Promoting pro-environmental behavior through citizen science? A case study with Chilean schoolchildren on marine plastic pollution. *Marine Policy*, *141*, 105035. https://doi.org/10.1016/j.marpol.2022.105035

Wyles, K. J., Pahl, S., Holland, M., & Thompson, R. C. (2017). Can beach cleans do more than clean-up litter? Comparing beach cleans to other coastal activities. *Environment and Behavior*, *49*(5), 509-535. https://doi.org/10.1177/0013916516649412

Wyles, K. J., Pahl, S., Thomas, K., & Thompson, R. C. (2016). Factors that can undermine the psychological benefits of coastal environments: exploring the effect of tidal state, presence, and type of litter. *Environment and behavior*, *48*(9), 1095-1126. https://doi.org/10.1177/0013916515592177