The Mediating Role of Environmental Awareness in the Relationship Between Science Literacy and Sustainable Practices

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ABSTRACT

As global environmental issues escalate, understanding how science education contributes to sustainable behavior becomes increasingly vital. This study investigated the mediating role of environmental awareness in the relationship between science literacy and sustainable practices among college students. With the use of descriptive-correlational research design, the researchers were able to measure the relationship among variables without manipulation. A total of 323 college students were enrolled in science-related courses at Misamis University were chosen through stratified random sampling technique. Data were collected from a diverse sample of college students through standardized questionnaires. Utilizing the Jamovi software, the researchers were able to use several statistical tools including mean and standard deviation, correlation, regression analysis, and mediation analysis. The findings revealed that there were (T1-T3) very high remarks about the students' level of science literacy, environmental awareness, and sustainable practices; (T4-T5) highly significant positive relationships between and among the variables; (T6) the best predictors of students' sustainable practices were knowledge of environmental issues and attitudes toward environmental protection; (T7) all paths in the mediation model and the path coefficients among the variables were statistically significant, although the direct effect of science literacy on sustainable practices was not, supporting the researchers' hypotheses. Furthermore, environmental awareness significantly mediated the relationship between science literacy and sustainable practices, accounting for 78.6% of the total effect, indicating strong full mediation. These results suggest that science literacy enhances environmental awareness, which leads to sustainable practices. Therefore, the study recommends integrating both cognitive and affective components in science education to develop environmentally responsible college students.

Keywords: science literacy, environmental awareness, sustainable practices, environmental education, student behavior, sustainability education, pro-environmental behavior

INTRODUCTION

In an era of climate crises and environmental degradation, science literacy is crucial in shaping responsible and informed individuals. The ability to comprehend and apply scientific concepts significantly influences students' dedication to sustainable practices and understanding of environmental issues. Scientific literacy involves recognizing, explaining, and drawing conclusions from scientific information using problem-solving skills such as comprehension, planning, analysis, and reassessment (Afnan et al., 2023). An update to the current structure of science literacy is needed due to evolving literature on modern topics like environmental issues, misinformation, science denial, and transformative actions (Kumar & Choudhary, 2024). Ensuring sustainability requires future generations to acquire scientific knowledge and competence to address global challenges stemming from a lack of scientific understanding (Jimenez & Alvarez-Hevia, 2022).

Environmental issues require urgent solutions before they become irreversible. University students, as academics, must be well-informed about pressing environmental challenges through formal and informal education to become role models and advocates for environmental protection (Handoyo, Astina, & Mkumbachi,

2021). Awareness of sustainability and environmental issues is a critical skill that enables students to address environmental difficulties worldwide (Setiawan et al., 2023). This study aims to investigate the impact of environmental consciousness, sustainable consumption, and green behavior among college students (Wardhana, 2022).

Sustainable development necessitates balancing human needs with environmental preservation (Al-Nuaimi & Al-Ghandi, 2022). Education plays a critical role in shaping sustainable values and attitudes (Imran et al., 2024), especially with global concerns like ozone depletion, air pollution, and global warming (Arshad et al., 2021). As environmental problems like waste management emerge, Higher Education Institutions (HEIs) actively implement anti-littering measures and sustainability efforts aligned with the Sustainable Development Goals (SDGs) (Ibrahim et al., 2021; Basheer et al., 2024). Schools with comprehensive environmental programs report higher student engagement and community involvement (Chavula et al., 2024). HEIs integrate sustainability into projects, curricula, and research to achieve campus sustainability (Ulkhaq & George Joseph, 2024).

HEIs play a vital role in sustainable development, with educators driving this effort (Aleixo, Leal, & Emeterio, 2021). However, despite awareness, university students often lack commitment to pro-environmental actions (Mkumbachi, Astina, & Handoyo, 2024), highlighting that environmental consciousness does not always lead to responsible behavior (Handoyo, Astina, & Mkumbachi, 2021). Gender disparities exist, with female students exhibiting significantly higher environmental awareness and sustainability behavior than male students (Setiawan et al., 2023). Even with limited environmental knowledge, students' perceptions and practices influence positive environmental behavior, emphasizing the need for integrated knowledge, attitude, and action (Jannah, 2023). Education is essential in promoting interventions to raise sustainability awareness, with digital tools enhancing environmental learning outcomes (Hajj-Hassan, Chaker, & Cederqvist, 2024).

Science education equips students with knowledge and skills to understand their surroundings, fostering critical thinking, problem-solving, and inquiry for informed decision-making and societal contribution (Learning Corner, 2025). Sustainable education empowers students with the abilities and mindsets needed to tackle environmental issues through classroom instruction, practical projects, and community service (Saben, 2024). A cooperative approach integrating formal scientific knowledge and indigenous systems is vital for promoting sustainability in science education (Anor, 2024). Sustainability involves protecting natural resources, fostering biodiversity, and balancing environmental preservation with human progress (Damico, Aulicino, & Di Pasquale, 2022). Understanding university students' views on sustainability helps institutions effectively integrate sustainable development into their educational environment (Concina & Frate, 2023). Global sustainability concerns highlight the inadequacy of current economic systems, prompting international organizations like the United Nations to establish new sustainability standards (Bonilla-Jurado, 2024). Environmental education fosters awareness, community involvement, and sustainable practices, catalyzing understanding environmental implications for individuals, communities, and organizations (Masongsong, 2024).

There appears to be a practical knowledge gap in the prior research on environmental awareness and sustainability practices among students. While numerous studies have explored the theoretical aspects of sustainability education, there is a lack of rigorous research focusing on the practical application of sustainability knowledge in student behaviors. Students often fail to act in accordance with their knowledge and awareness of sustainability because they believe their everyday campus activities have no impact on the environment. The impact of environmental education leads to the conclusion that, even though students' attitudes are not fully reflected in their actions, conscious actions are in line with the level of environmental education (Zsóka et al., 2013). The field of environmental education is ripe for an investigation of practical-focused research on students' sustainability actions and attitudes. Many prior studies focus on the theoretical aspects of sustainability and environmental awareness; however, there are very few practical studies or action research in the field of student engagement in pro-environmental activities. Research shows that although students frequently have positive views about sustainability, these views do not always result in sustainable actions (Chuvieco et al., 2017). This is an essential and worthy area of investigation in the context of higher education institutions. An investigation of these issues is necessary because students' awareness of environmental issues does not always translate into responsible environmental actions. Furthermore, previous theoretical research has focused primarily on

sustainability awareness, and very little practical research has been done on students' actual pro-environmental behaviors in educational institutions (Miles, 2017).

Given the increasing urgency of global environmental challenges, it is crucial to understand how science literacy influences students' awareness and actions at the local level. Notably, this study assesses the relationship between science literacy, environmental awareness, and sustainable practices among college students at a tertiary institution in Ozamiz City during the school year 2024-2025 to foster more effective strategies for promoting environmental awareness and sustainable practices. Moreover, this study can benefit the entire educational sector and environmental organizations by providing insights into students' environmental awareness and helping create better programs that promote sustainability and environmental responsibility.

Theoretical Framework

This study was based on the Constructivist Learning Theory (Piaget, 1950), Social Learning Theory (Bandura, 1977), and Environmental Education Theory (Hungerford & Volk, 1990). Piaget's theory emphasizes active learning, where students engage with real-world sustainability issues to build knowledge. Bandura's theory highlights learning through observation and imitation, shaping students' pro-environmental behaviors. Hungerford and Volk's theory emphasizes the need for knowledge, responsibility, and empowerment to drive meaningful action. Together, these theories provide a comprehensive framework for understanding how education fosters environmental consciousness and sustainable actions among college students.

Science education plays a pivotal role in shaping students' understanding of environmental issues and fostering sustainable practices. This framework draws on Constructivist Learning Theory, as developed by Jean Piaget (1950). Piaget's theory emphasizes that learning occurs through active engagement with the environment. This means that, in the context of environmental education, students should have the chance to participate in practical exercises that address contemporary environmental concerns, including waste management, conservation, and climate change. Students can build their understanding of environmental systems and sustainability by connecting abstract ideas to real-world applications through exercises, including experiments, field observations, and problem-solving exercises.

People pick up new behaviors through imitation, reinforcement, and observation (Bandura, 1977). Science instruction is essential for setting an example of sustainable behavior because students learn to modify their behavior by seeing peers, instructors, and environmentalists behaving in ways that benefit the environment. Understanding the co-construction of scientific concepts is only one aspect of science education; another is the development of students' science process skills through group problem-solving, project-based learning, role-playing, and inquiry-based learning to create and construct meaning from scientific concepts, problems, and phenomena. This study aligns with Bandura's Social Learning Theory, emphasizing the role of science education in shaping students' environmental awareness and sustainable practices through societal interactions.

Through the use of Social Learning Theory, science education promotes awareness of the environment as a lived experience as well as information, which results in long-lasting behavioral change. Students observe, imitate, and engage in real-world sustainable activities that are modeled by their teachers, peers, and communities, rather than only learning about environmental principles. Through practical experiences like waste management programs, tree planting events, or energy conservation projects, environmental education helps students engage with sustainability on a deeper level than just theoretical knowledge. Sustainable behaviors become embedded in their daily routines and normalized through active participation and regular exposure. Positive reinforcement, such as praising eco-friendly efforts, also encourages pupils to keep making environmentally conscious decisions.

Finally, this study utilized the Environmental Education Theory proposed by Hungerford and Volk (1990). Their model for environmental education consists of three key components: (1) entry-level variables, which serve as the foundation for awareness and engagement; (2) ownership variables, which reflect the extent to which an individual feels connected to or responsible for a problem, influencing their willingness to become more

involved; and (3) empowerment variables, which encompass the necessary skills and motivation to take meaningful action.

By applying the Environmental Education Theory, it raises students' knowledge of environmental issues and encourages sustainable behavior. It provides students with the information they need to understand ecological issues, fosters a sense of environmental responsibility, and equips them with the resources to take meaningful action. Students are empowered to embrace eco-friendly practices and support sustainability initiatives in their communities through practical exercises, real-world applications, and critical thinking.

Conceptual Framework

Scientific literacy is the capacity to apply scientific knowledge and procedures to comprehend scientific facts in order to solve issues or make judgments (Effendi et al., 2021). The components of the levels of science literacy include *(a) science curriculum (SC), (b) environmental science integration (ESI), and (c) digital tools for environmental learning (DTEL).*

The science curriculum assists students in gaining a fundamental understanding of scientific concepts and the components of the world, as well as the methods by which they acquire this knowledge. Students are also encouraged to consider and value the ways that science impacts their lives and the environment, as well as to develop good attitudes about science (Boston College, 2025). Thus, the curriculum focuses on attitudes that encourage the application of scientific knowledge in many contexts and circumstances related to science education. The curriculum's competence targets center on applying scientific knowledge to describe, explain, and forecast scientific occurrences, assess and recognize scientific problems, and analyze data and evidence in a scientific manner (Lavonen, 2021).

Integrating environmental education into the curriculum was crucial for students since science instruction is the subject most likely to be combined with environmental education (Sukma & Indriyani, 2020). Also, the integration of environmental protection with college is a kind of new investigation of sustainable education at the university level. Spreading ecological consciousness and sustainability that is appropriate for modern educational goals (Hao, 2021).

Digital technologies offer a variety of tools that are chosen to incorporate formalized learning settings into higher education instruction, and students use these resources to further their education (Alenezi, 2023). This has become a vital instrument to increase productivity and efficiency while reducing or eliminating waste and pollution, as this has made a paradigm shift in the entire education system. As educational technology has simplified students' lives, it acts as a mentor, assessor, and co-creator of conveying environmental knowledge. These days, students prepare presentations and projects utilizing a variety of software and tools rather than pen and paper. An iPad weighs comparatively less than a stack of notebooks, and an e-book is simpler to navigate than a heavy book (Haleem et al., 2022).

Students' environmental awareness is having knowledge about the environment. It indicates the concepts, beliefs, and values that help and contribute to the natural world's well-being by analyzing and comprehending the issues related to the environment (Mahanta, B., & Sarkar, 2023). The components of students' environmental awareness include *(a) knowledge of environmental issues (KEI), (b) concern for sustainability (CS), and (c) attitudes toward environmental protection (ATEP).*

Knowledge of environmental issues has a positive indirect impact on students' behavior as citizens by encouraging them to take action. Through awareness of environmental challenges and the desire to take action, students who are environmentally sensitive exhibit indirect positive effects on their behavior as citizens (Susilowati, Miarsyah, & Sigit, 2020). Improving human-environmental literacy and addressing global environmental issues require the promotion of environmental education. Environmental education and environmental concerns have been given more attention in management education in an effort to improve people's understanding of and appreciation for the environment (Alauya-Dica et al., 2022).

Students that are more concerned are more likely to actively support sustainable development through reuse, reduction, and recycling practices and take part in organized events to advance environmental or societal protection (Aleixo, Leal, & Azeiteiro, 2021). The importance of natural resources and the environment was the aspect of environmental conservation that students were most conscious of. These are engagement in environmental conservation, environmental protection model knowledge, environmental conservation news awareness, and environmental conservation knowledge (Praimee et al., 2023).

Students already have concepts of environment protection and believe that in order to address the environmental problems they face, they need to receive quality environmental education. This demonstrates how important aspects of attitudes become crucial components for altering them. Studies of gender-based variations in attitudes (both cognitive and affective) are also validated (Esteban Ibanez et al., 2020). Students' had an average attitude toward environmental protection; female students scored marginally higher on average than male students, but there was no noticeable difference between the two groups in terms of attitudes (Christina Vanlalhmangaihzuali, 2022). Encouragement of their positive growth can enable them to actively contribute to their environment by embracing positive attitudes and actions (Bøhlerengen & Wiium, 2022).

Students' sustainable practices, such as interventions and educational programs, can promote eco-friendly attitudes and contribute to the growth of the community (Ben Romdhane, Lee, & Al-Shaebi, 2023). The components of students' sustainable practices include *(a) eco-friendly behavior (EB), (b) green consumption habits (GCH), and (c) active participation in sustainability programs (APSP).*

Eco-friendly behavior partially mediates the relationship between environmental performance and green human resource practices (Gill, Ahmad, & Kazmi, 2021). Through eco-friendly practices conducted in school, it builds positive behaviors. Students' also engaged in scientific practice to better comprehend the environmental care process and to cultivate positive character traits (Muafiah et al., 2021).

It is vital to comprehend college students' green consuming habits in order to update university instructional and governmental regulations (Tang et al., 2020). It was found out that there was a strong and favorable correlation between knowledge responsiveness to green innovation, knowledge acquisition, and knowledge diffusion. Furthermore, the relationship between green innovation and knowledge transmission is mediated by environmental consciousness (Polas et al., 2023). Environmental consciousness has a significant impact on sustainable consumption, according to the multiple linear regression model. Additionally, the university students' green conduct was significantly impacted by their level of environmental knowledge (Wardhana, 2022).

Active participation in sustainability programs of students in school, such as project-based learning, recycling, and school gardening, positively impacts academic performance, environmental awareness, and pro-environmental behaviors (Kofi, 2024). Strong collaborations between the organization, the local government, and the commercial sector, the incorporation of environmental education into the curriculum, consistent funding, and dedicated leadership are some of the aspects that have contributed to the programs' success. These initiatives demonstrate the value of consistent dedication and collaboration across all sectors in advancing sustainability and environmental education by providing examples of how communities and schools may collaborate to address environmental issues in a creative and useful manner (Kilag et al., 2023).

Measures of scientific literacy are most strongly correlated with students' awareness, such as greenhouse gases, but their interest in general scientific subjects and love of science indicate that students who take challenging and entertaining science classes in school are better equipped to be informed citizens about climate change. Given the increased interest in equity issues around the world, it contends that curriculum designers and educational institutions can foster interest and enjoyment in fostering positive attitudes, environmental awareness, and environmental responsibility in addition to the development of scientific literacy (Oliver & Adkins, 2020). Additionally, students' perceptions of the university's sustainable practices and their level of happiness are greatly influenced by the quality of the services they get in school. Students' happiness is also predicted by sustainable practices (Chaudhary & Dey, 2021).

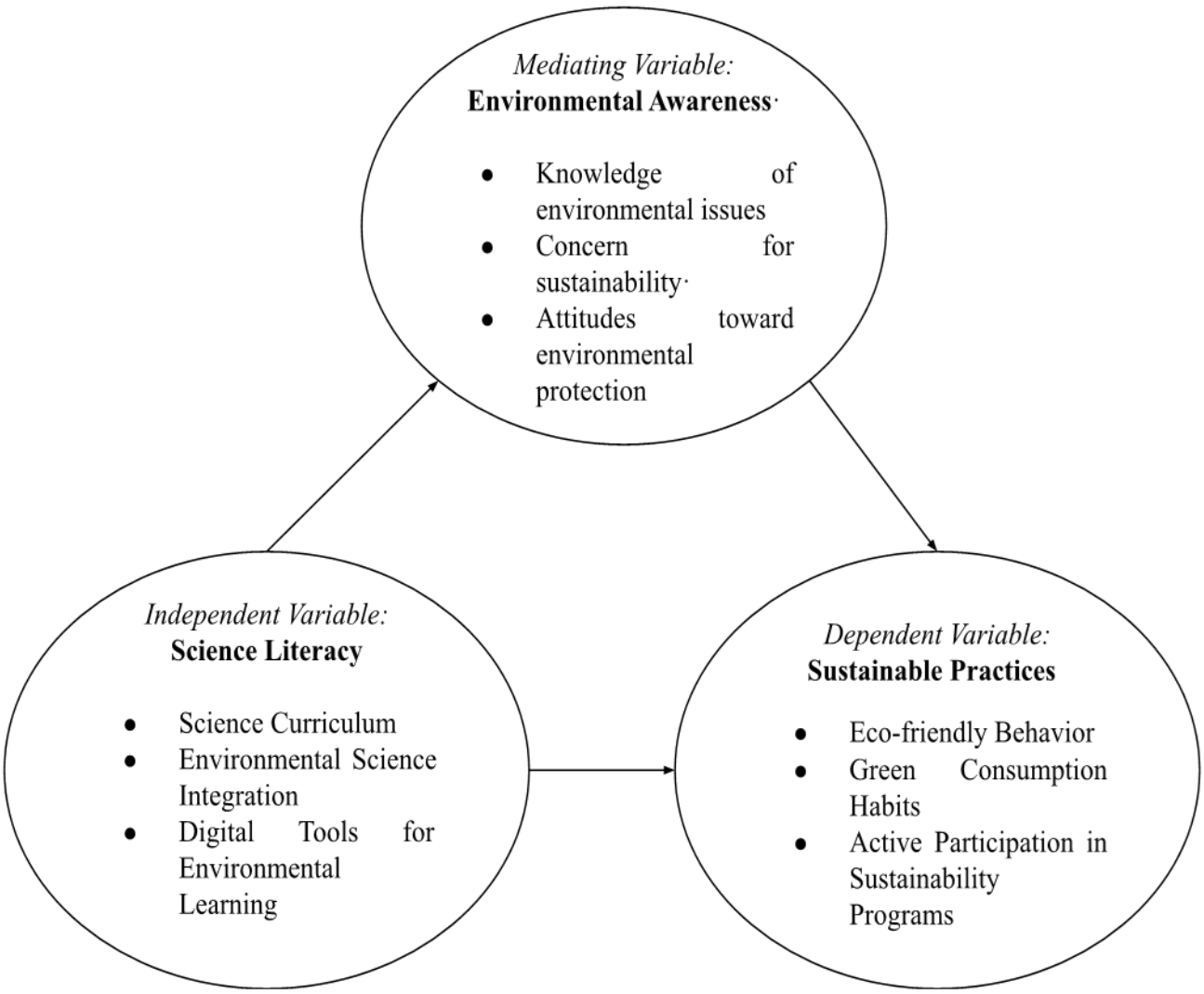

Figure 1. Schematic Diagram of the Study

Research Questions

This study explored the mediating role of environmental awareness in the relationship between science literacy and sustainable practices among college students at a tertiary institution in Ozamiz City during the school year 2024-2025. Specifically, the study sought to answer the following objectives:

1. What is the level of science literacy of college students in terms of:

    1.1 Science Curriculum (SC)

    1.2 Environmental Science Integration (ESI)

    1.3 Digital Tools for Environmental Learning (DTEL)

2. What is the level of students' environmental awareness in terms of:

    2.1 Knowledge of Environmental Issues (KEI)

    2.2 Concern for Sustainability (CS)

    2.3 Attitudes Toward Environmental Protection (ATEP)

3. What are the students' sustainable practices in terms of:

3.1 Eco-friendly Behavior (EB)

3.2 Green Consumption Habits (GCH)

3.3 Active Participation in Sustainability Programs (APSP)

4. Is there a significant relationship between science literacy and the students' sustainable practices?

5. Is there a significant relationship between the students' environmental awareness and their sustainable practices?

6. What are the independent variables that predict singly or in combination with the students' sustainable practices?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

H1: Science literacy is positively correlated with sustainable practices among college students.

H2: Science literacy is positively correlated with environmental awareness among college students.

H3: Environmental awareness is positively correlated with sustainable practices among college students.

H4: Environmental awareness mediates the relationship between science literacy and sustainable practices among college students.

METHODS

Research Design

This quantitative approach utilized a descriptive-correlational design. This design examined the relationship among two or more variables in a single group and analyzed their pattern without manipulating any factor. This kind of non-experimental design looked at how two or more variables related to one another without modifying or controlling any of the variables. The direction and/or degree of the relationship between two or more variables are reflected in a correlation, either positive or negative direction (Devi et al., 2022). The descriptive-correlational research design was appropriate for this study, as it measured and analyzed the direction and/or degree of interrelation between the level of science literacy, students' environmental awareness, and students' sustainable practices without controlling or manipulating these variables.

Research Setting

This study was conducted at Misamis University, situated in H.T. Feliciano St., Ozamiz City, 7200, Philippines. This is a private, non-sectarian higher institution that was established in 1929 and has achieved significant milestones over the years. It advocated a progressive and dynamic education that upholds the principles to produce globally competent individuals to be a globally recognized institution of learning. Misamis University proudly stands for all its accomplishments, having grown from just four courses when it started to more than 58 courses offered now. This higher institution offered science-related courses, such as the College of Nursing, Midwifery, and Radiologic Technology, the College of Dentistry, the College of Criminology, the College of Agriculture and Forestry, and the College of Education, particularly the major in Science and General Education. It had received accreditations and recognitions for quality education and research, such as being granted DEREGULATED STATUS per CHED MEMO 21, S. 2004 by virtue of Resolution No. 393-2003, and the first and only ISO certified university by Det Norske Veritas, The Netherlands for Quality Education and Service in Mindanao. The university received ISO 9001:2000 certification on April 28, 2005, and five years later, ISO

9001:2008 certification for its Quality Management System. The university focused not only on enhancing global learning, innovation, and partnerships but also on strengthening environmental advocacy. In this regard, the research setting provided a learning environment that gave students the chance to enhance their science literacy, environmental awareness, and sustainable practices. Additionally, their exposure to these educational opportunities may have an impact on their sustainability-related attitudes and actions. Students' degree of involvement in sustainable practices may have been influenced by their scientific knowledge and environmental awareness, which they have acquired through the university's advocacy efforts.

Respondents of the Study

This study included 323 college students of Misamis University. This study utilized a stratified random sampling technique to ensure a representative sample of the student population within the university. The respondents were selected based on the following criteria: (1) college students enrolled in the SY 2024-2025 who are taking one of the science-related courses, and (2) students who gave their complete agreement to participate in the survey. The researchers ensured that all requirements were met before distributing the surveys in order to preserve the validity of the selection procedure.

Research Instruments

The study was conducted using questionnaires as data-gathering instruments:

A. Level of Science Literacy Questionnaire (Appendix A). Using this instrument, designed in a 5-point Likert scale format, allowed respondents to rate their frequency of engagement with behaviors or perceptions related to science literacy, ranging from (5) Always, (4) Often, (3) Sometimes, (2) Seldom, to (1) Never. Adopted from Siegel & Ranney (2003) and Liu & Zhang (2024), it consisted of 14 items categorized into three constructs: science curriculum (5 items), environmental science integration (5 items), and digital tools for environmental learning (4 items). The science curriculum assessed scientific familiarity, environmental science integration evaluated topic incorporation, and digital tools enhanced understanding. These items highlight science literacy's role in informed decision-making and sustainability. For reliability, the questionnaire was tested using Cronbach's alpha test with a 0.97 value indicating consistency.

To determine the students' level of science literacy among college students, the following scale was utilized:

Responses	**Continuum**	**Interpretation**
5- Always	4.20 - 5.00	Very High
4- Often	3.40 - 4.19	High
3- Sometimes	2.60 - 3.39	Moderate
2- Seldom	1.80 - 2.59	Low
1- Never	1.00 - 1.79	Very Low

B. Students' Environmental Awareness (Appendix B). Using this instrument, designed in a 5-point Likert scale format, allowed respondents to rate their engagement in activities and perceptions related to environmental awareness, ranging from (5) Always, (4) Often, (3) Sometimes, (2) Seldom, to (1) Never. Adopted from Rogayan Jr. & Nebrida (2019), it consisted of 15 items categorized into three constructs: knowledge of environmental issues (5 items), concern for sustainability, and attitudes toward environmental protection. Knowledge evaluates ecological understanding, concern measures sustainability awareness, and attitudes assess commitment to eco-friendly behaviors. These items highlighted students' environmental awareness and its role in shaping sustainability attitudes and eco-friendly practices. For reliability, the questionnaire was tested using Cronbach's alpha test with a 0.97 value indicating consistency.

To determine the students' environmental awareness among college students, the following scale was utilized:

Responses	Continuum	Interpretation
5- Always	4.20 - 5.00	Very High
4- Often	3.40 - 4.19	High
3- Sometimes	2.60 - 3.39	Moderate
2- Seldom	1.80 - 2.59	Low
1- Never	1.00 - 1.79	Very Low

C. Students' Sustainable Practices (Appendix C). Using this instrument, designed in a 5-point Likert scale format, allowed respondents to rate their actions and perspectives on sustainable practices, ranging from (5) Always, (4) Often, (3) Sometimes, (2) Seldom, to (1) Never. Adopted from Rogayan Jr. & Nebrida (2019), it consisted of 15 items categorized into three constructs: eco-friendly behavior (5 items), green consumption habits, and active participation in sustainability programs. Eco-friendly behavior is assessed through waste reduction and energy saving, green consumption, and a measured preference for sustainable products, as well as active participation in environmental initiatives. These items were relevant as they emphasized students' sustainable practices, which helped determine their level of science literacy in promoting sustainability among college students. For reliability, the questionnaire was tested using Cronbach's alpha test with a 0.97 value indicating consistency.

To determine the students' sustainable practices among college students, the following scale was utilized:

Responses	Continuum	Interpretation
5- Always	4.20 - 5.00	Very Good
4- Often	3.40 - 4.19	Good
3- Sometimes	2.60 - 3.39	Fair
2- Seldom	1.80 - 2.59	Poor
1- Never	1.00 - 1.79	Very Poor

Data Collection

The researchers secured a formal permission letter from the college dean, obtaining consent to conduct the study. After obtaining consent, the researcher obtained approval from the program head and the research teacher. After approval, the researchers created a permission form for the respondents. Before obtaining the respondents' informed consent, the researcher discussed the study's purpose and the ethical considerations to ensure the respondents understood the process. Subsequently, the researchers used Google Forms and printed hard copies of the survey questionnaires. The Google Forms links were then disseminated to the college students with varying programs via online messaging platforms, making it easier for students from various programs to take part.

Furthermore, the researchers set vacant schedules in sending the survey links and printed hard copies to guarantee that participants were fully informed and willingly took part in the study; a permission was included in every survey form. Once the questionnaires were completed, the data were tallied using Microsoft Excel, which was used to collate and arrange the responses. SPSS software was then used to do statistical calculations on the dataset. To enable a thorough examination and interpretation of the data, the findings were organized in tabular

form.

Ethical Considerations

Ethics in research refers to the standards and principles that direct choices about data collection, analysis, and distribution (Gedutis et al., 2022).

Prior to conducting the research, consent was requested from Misamis University's College of Education dean. After receiving the approved letter, the researchers began conducting the research using online and in-person approaches. In addition to the offered surveys, respondents' informed consent will be obtained before responding to the survey questionnaires to ensure the study's ethical integrity. The respondents were told of the study's aims, data confidentiality, potential advantages, and other details, as well as their anonymity throughout the process. Furthermore, the researchers reminded the participants that their participation was entirely voluntary and that they could respond to or reject any questions or remarks that made them uncomfortable. In order to preserve the confidentiality and dignity of the participants and their organization, the researchers thoroughly followed Republic Act No. 10173, also known as the "Data Privacy Act of 2012," and ethical guidelines when collecting, analyzing, and disseminating the study's findings.

Data Analysis

The study utilized the following tools for analyzing the collected data using Jamovi software:

Mean and Standard Deviation were used in determining the college students' level of science literacy, their environmental awareness, and their engagement in sustainable practices. *Pearson Product Moment Correlation Coefficient* was used to determine the relationships between students' level of science literacy, their level of environmental awareness, and their engagement in sustainable practices.

Multiple linear regression analysis was used to examine the relationships among science literacy, environmental awareness, and sustainable practices, predicting their influence on each other and analyzing the combined effects of multiple variables for a deeper understanding.

RESULTS AND DISCUSSION

Science Literacy

Table 1 presents the students' level of science literacy based on three constructs: Science Curriculum (SC), Environmental Science Integration (ESI), and Digital Tools for Environmental Learning (DTEL), alongside their overall literacy level. The findings showed that the students had a very high overall level of science literacy (M = 4.31, SD = 0.58). Among the three constructs, Environmental Science Integration (ESI) received the highest mean score (M = 4.51, SD = 0.49), followed by Digital Tools for Environmental Learning (DTEL) (M = 4.23, SD = 0.64), while Science Curriculum (SC) had the lowest mean score (M = 4.18, SD = 0.60), though still in the high category.

The Environmental Science Integration (ESI) received the highest score among all domains, with a very high level (M = 4.51, SD = 0.49). This suggested that students were highly exposed to and engaged in environmental science topics within their learning experiences. The high score indicated that environmental issues were effectively embedded in lessons, discussions, or projects, fostering students' awareness and understanding of ecological systems, sustainability, and human impact. This result reflected the growing importance placed on environmental education, possibly driven by the current global climate crisis and local environmental campaigns that resonated with students' daily lives and social values.

The Digital Tools for Environmental Learning (DTEL) was also rated very high (M = 4.23, SD = 0.64), indicating that students frequently utilized digital technologies to support their science learning, especially in environmental contexts. This could have included the use of multimedia presentations, educational websites, virtual labs, mobile apps, or online databases to explore scientific data and simulate environmental processes.

The integration of digital tools likely enhanced student engagement and understanding by providing interactive and visual learning experiences. However, the slightly higher standard deviation suggested some variability in access to or effectiveness of these tools among students, which may have been influenced by differences in resources, internet connectivity, or teacher proficiency in technology integration.

The Science Curriculum (SC) construct, which obtained a high rating (M = 4.18, SD = 0.60), reflects students' positive perceptions of the formal science content delivered in schools. Although this score indicated a strong foundation in science education, it was the lowest among the three constructs, which may have suggested areas for improvement in the way science was taught or structured. While the curriculum provided essential knowledge, it may have lacked engaging, real-world applications or interdisciplinary approaches that could have made scientific concepts more meaningful and practical for students. This finding also reflected a need for enhanced teaching strategies that connected the curriculum with students' everyday experiences and environmental concerns.

The Constructivist Learning Theory (Vygotsky, 1978) emphasized the importance of connecting new information with learners' experiences and real-world contexts. Science curricula incorporating environmental themes significantly improved students' science achievement and environmental self-efficacy (Wilson et al.,2024). Similarly, meaningful integration of environmental content fosters ecological values and scientific understanding (Keles, 2023).

Regarding digital engagement, tools such as simulations and virtual labs boosted science engagement and deepened understanding (Namdar & Shen, 2024). However, caution that unequal access to technology can affect learning outcomes, pointing to the need for equitable digital integration. These insights reinforced the importance of curriculum reform that is interdisciplinary, technology-integrated, and grounded in real-world environmental challenges (Baser & Ozden, 2023).

The findings suggested that while students exhibited a commendably high level of science literacy, particularly in environmental integration and the use of digital tools, there remained room for strengthening the foundational curriculum. School administrators, science coordinators, and policymakers were encouraged to revisit and enrich the existing science curriculum to ensure that it was not only content-rich but also contextually relevant and student-centered. Teachers should have been supported through ongoing training that emphasized interdisciplinary teaching, inquiry-based approaches, and environmental awareness. Furthermore, incorporating project-based learning that combines science, technology, and real-life environmental issues helped bridge the slight gap seen in the curriculum construct. Activities such as eco-friendly school campaigns, community-based science projects, and digital storytelling on environmental topics could have provided more meaningful and applied learning experiences that reinforced all three constructs.

Table 1 Students' Level of Science Literacy (n=323)

Constructs	M	SD	Remarks
Science Curriculum (SC)	4.18	0.60	High
Environmental Science Integration (ESI)	4.51	0.49	Very High
Digital Tools for Environmental Learning (DTEL)	4.23	0.64	Very High
Overall Literacy	4.31	0.58	Very High

Note: 4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Moderate); 1.80-2.59 (Low); 1.00-1.79 (Very Low*)*

Environmental Awareness

Table 2 presents the students' level of environmental awareness based on three constructs: Knowledge of Environmental Issues (KEI), Concern for Sustainability (CS), and Attitudes Toward Environmental Protection (ATEP), along with the overall level of environmental awareness. The overall result showed a very high level

of environmental awareness among students (M = 4.43, SD = 0.51). Among the three constructs, Attitudes Toward Environmental Protection (ATEP) was rated the highest (M = 4.65, SD = 0.44), followed closely by Concern for Sustainability (CS) (M = 4.58, SD = 0.50), both of which fell under the very high category. Knowledge of Environmental Issues (KEI) received the lowest score (M = 4.07, SD = 0.60), though still within the high category.

The Attitudes Toward Environmental Protection (ATEP) received the highest rating (M = 4.65, SD = 0.44), indicating that students possessed strong personal values and positive attitudes toward environmental preservation. This suggested that learners were likely to support eco-friendly practices, express concern about pollution and biodiversity loss, and advocate for sustainable actions. The low standard deviation also showed consistent responses among students, implying a shared sense of environmental responsibility. Such strong attitudes may have been shaped by environmental campaigns, school activities, or social influences that emphasized the moral and ethical dimensions of protecting the planet.

The Concern for Sustainability (CS) was also rated very high (M = 4.58, SD = 0.50), reflecting that students were deeply aware of the long-term importance of sustainability. They likely understood the value of conserving natural resources, reducing waste, and promoting energy efficiency for future generations. This level of concern may have been linked to increased public discourse on climate change and sustainability challenges, as well as students' exposure to real-world environmental issues through media or classroom discussions. Their concern indicated readiness to support sustainable development goals and environmental stewardship initiatives.

The Knowledge of Environmental Issues (KEI) received a high rating (M = 4.07, SD = 0.60), making it the lowest among the three dimensions of environmental awareness. This suggested that while students showed strong attitudes and concern, they may have had limited factual understanding or technical knowledge about specific environmental problems such as global warming, deforestation, or pollution sources. The higher standard deviation also pointed to more variation in students' knowledge levels. This highlighted a potential gap where students may have been emotionally engaged but not yet fully informed about scientific or policy-related aspects of environmental issues.

Students' high environmental attitudes were often the result of school activities and societal influences that promote ecological values (Karadag, 2021). The concern for sustainability observed in students aligns with the Yale School of Management's Global Network Survey (2022), which reported that learners across the globe increasingly prioritize sustainability and advocate for experiential learning.

The knowledge gap noted in KEI emphasized that while students may exhibit strong environmental concern, their technical knowledge can be lacking (Schmidt, 2007). To address this, it was suggested that robust environmental education programs improve not only knowledge but also attitudes, intentions, and behaviors related to environmental issues (Ardoin et al., 2022).

The findings indicated that while students exhibited very high environmental awareness in terms of values and concern, there was a need to enhance their factual knowledge about environmental issues. School administrators and science educators should have strengthened environmental education by integrating more knowledge-based content into the curriculum. This could have been achieved through inquiry-based lessons, case studies, and discussions on current environmental challenges. Activities such as science reporting, environmental journalism, or student-led campaigns promoted deeper understanding. Additionally, partnerships with environmental organizations and guest lectures from experts could have provided credible and up-to-date information. By reinforcing the knowledge base, educators could have ensured that students were not only passionate advocates but also informed decision-makers in environmental protection efforts.

Table 2 Students' Level of Environmental Awareness (n=323)

Constructs	M	SD	Remarks
Knowledge of Environmental Issues (KEI)	4.07	0.60	High

Concern for Sustainability (CS)	4.58	0.50	Very High
Attitudes Toward Environmental Protection (ATEP)	4.65	0.44	Very High
Overall Environmental Awareness	4.43	0.51	Very High

Note: 4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Moderate); 1.80-2.59 (Low); 1.00-1.79 (Very Low)

Sustainable Practices

Table 3 presented the students' level of sustainable practices based on three constructs: Eco-friendly Behavior (EB), Green Consumption Habits (GCH), and Active Participation in Sustainable Programs (APSP), as well as their overall sustainable practice rating. Overall, students demonstrated an excellent level of sustainable practices (M = 4.37, SD = 0.62). Among the constructs, Eco-friendly Behavior (EB) was rated the highest (M = 4.56, SD = 0.52), followed by Green Consumption Habits (GCH) (M = 4.37, SD = 0.57), while Active Participation in Sustainable Programs (APSP) received the lowest rating (M = 4.17, SD = 0.78), placing it in the good category.

The Eco-friendly Behavior (EB) received the highest rating (M = 4.56, SD = 0.52), indicating that students consistently practiced sustainability in their daily routines. These behaviors may have included actions such as turning off lights and appliances when not in use, reducing single-use plastics, practicing waste segregation, and promoting cleanliness in their environment. The relatively low standard deviation reflected that such habits were commonly practiced across most respondents, showing a strong shared commitment to individual environmental responsibility. This suggested that foundational environmental values and behaviors had been successfully internalized by students, possibly due to repeated reinforcement through school routines and home practices.

The Green Consumption Habits (GCH) was also rated very good (M = 4.37, SD = 0.57), suggesting that students were making environmentally conscious choices as consumers. These habits could have included using eco-friendly and reusable products, minimizing food waste, avoiding excessive packaging, and supporting local or sustainable goods. While slightly lower than EB, this score still demonstrated a commendable level of environmental mindfulness when it came to purchasing and consumption. This may have been influenced by education on sustainability, community norms, or increasing awareness through social media and advocacy campaigns that encouraged more responsible consumer behavior. The high mean score implied that students not only valued sustainability but also felt empowered to act on it.

The Active Participation in Sustainable Programs (APSP) received the lowest mean score (M = 4.17, SD = 0.78), placing it in the good category. This suggested that while students demonstrated individual sustainable behaviors and habits, their involvement in structured environmental programs or collective sustainability initiatives was comparatively less frequent. Participation in cleanup drives, environmental clubs, tree-planting activities, and advocacy campaigns may not have been as widespread or accessible to all students. The higher standard deviation also indicated variability in responses, possibly reflecting differences in motivation, time availability, or opportunities to join such programs. This highlighted a gap between personal practice and community-level engagement in sustainability.

Sustainability education and environmental media campaigns have significantly shaped how young people make eco-conscious choices (Anikwe et al., 2024). By increasing awareness, these efforts help students understand the impact of their actions on the environment. This aligns with the Theory of Planned Behavior (Ajzen, 1991), which explains that when students have positive attitudes, feel social support, and believe they can make a difference, they're more likely to adopt sustainable habits.

When students are regularly exposed to environmental values in school and through the media, they're more motivated to act. Activities like cleanup drives, recycling, and campus sustainability programs help them connect emotionally to environmental issues, making their actions more meaningful and lasting (Ardoin et al., 2022). Education paired with real-life practice truly encouraged long-term sustainable behavior.

The results showed that students possessed strong eco-friendly behaviors and green consumption habits, but their

engagement in organized sustainability efforts needed improvement. School leaders, program coordinators, and environmental educators were encouraged to provide more structured and inclusive opportunities for students to participate in sustainability initiatives. These could have included integrating environmental service learning into the curriculum, establishing active student-led environmental organizations, and hosting sustainability-themed school events such as green weeks or eco-fairs. Partnerships with local environmental groups and barangay cleanup projects could also have helped students apply their values to real-world contexts. By fostering a culture of participation and providing meaningful experiences, students could further develop their commitment from individual practices to active environmental leadership.

Table 3

Students' Level of Sustainable Practices (n=323*)*

Constructs	M	SD	Remarks
Eco-friendly Behavior (EB)	4.56	0.52	Very Good
Green Consumption Habits (GCH)	4.37	0.57	Very Good
Active Participation in Sustainable Programs (APSP)	4.17	0.78	Good
Overall Sustainable Practices	4.37	0.62	Very Good

Note: 4.20-5.00 (Very Good); 3.40-4.19 (Good); 2.60-3.39 (Fair); 1.80-2.59 (Poor); 1.00-1.79 (Very Poor*)*

Significant Relationship between the Students' Level of Science Literacy and their Sustainable Practices

Using Jamovi software, both p-value and r-value (correlation coefficients) of the latent variables were obtained and were used to determine the significance of the relationship between the students' level of science literacy and their sustainable practices (Table 4). The data revealed that all constructs under science literacy, the science curriculum, environmental science integration, and digital tools for environmental learning showed statistically significant positive correlations ($p < .001$) with all three dimensions of sustainable practices. The findings supported the hypothesis that increased science literacy was positively associated with higher engagement in sustainable actions.

The science curriculum was significantly correlated with eco-friendly behavior ($r = 0.28$, $p < .001$), green consumption habits ($r = 0.29$, $p < .001$), and active participation in sustainability programs ($r = 0.25$, $p < .001$). These results indicated that students who found their science education comprehensive and relevant were more likely to translate their learning into real-life sustainable behaviors. A science curriculum that covered environmental issues, ecological principles, and sustainability topics likely reinforced awareness and responsibility, prompting students to engage in practices such as reducing waste, conserving resources, and supporting eco-friendly initiatives.

The environmental science integration showed the strongest relationship with eco-friendly behavior ($r = 0.45$, $p < .001$) and also demonstrated significant positive associations with green consumption habits ($r = 0.29$, $p < .001$) and active participation in sustainability programs ($r = 0.18$, $p < .001$). These findings suggested that when environmental topics were explicitly integrated into science lessons, students were more inclined to adopt pro-environmental behaviors. By understanding environmental challenges like climate change, pollution, and biodiversity loss, students developed a stronger sense of responsibility and were more likely to make informed decisions in favor of sustainability.

The digital tools for environmental learning were also significantly related to all three sustainable practice domains: eco-friendly behavior ($r = 0.30$, $p < .001$), green consumption habits ($r = 0.33$, $p < .001$), and active participation in sustainability programs ($r = 0.31$, $p < .001$). These correlations indicated that the use of digital resources such as online platforms, educational videos, mobile applications, and virtual simulations enhanced student engagement with environmental content and supported the development of sustainable habits. Digital

tools may have provided interactive and personalized learning experiences that made environmental issues more relatable and urgent, thereby encouraging students to take action.

This aligned with the Constructivist Learning Theory (Bruner, 1960), which emphasized that meaningful learning occurs when students actively connect new knowledge with real-world experiences. When curricula are infused with environmental themes and systems thinking, students tend to show increased ecological literacy and greater behavioral engagement (Lee & So, 2019).

Additionally, Bandura's Social Cognitive Theory (1986) highlighted how students learn behaviors by observing the outcomes of environmental actions and modeling pro-environmental behaviors demonstrated by teachers, peers, or digital media. Students who frequently used educational technologies in science classes reported higher levels of environmental engagement and a stronger intention to participate in sustainability efforts (Ali & Ulker, 2023).

The consistently significant findings across all constructs implied that science literacy played a vital role in shaping students' sustainable practices. To build on these insights, school administrators and science educators should enrich the curriculum with hands-on, real-world environmental topics, ensuring they are well-integrated and student-centered. Professional development workshops could have been conducted to train teachers in using digital tools effectively for sustainability education. Suggested activities included project-based learning on local environmental issues, digital campaigns for environmental awareness, and student-led sustainability initiatives within schools. By fostering strong science literacy supported by modern teaching tools and meaningful content, educators could empower students to become informed and active participants in sustainable development.

Table 4 Significant Relationship between the Students' Level of Science Literacy and their Sustainable Practices

Variables		Eco-friendly Behavior	Green Consumption Habits	Active Participation in Sustainability Programs
Science Curriculum	*r*	0.28	0.29	0.25
	p	<0.001	<0.001	<0.001
Environmental Science Integration	*r*	0.45	0.29	0.18
	p	<0.001	<0.001	<0.001
Digital Tools for Environmental Learning	*r*	0.30	0.33	0.31
	p	<0.001	<0.001	<0.001

Notes: Ho: There is a highly significant relationship between the students' level of environmental awareness and their sustainable practices.

Probability Value Scale: *** p < .001 (Highly Significant);**p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

Significant Relationship between the Students' Level of Environmental Awareness and their Sustainable Practices

Using Jamovi software, both p-value and r-value (correlation coefficients) of the latent variables were obtained and were used to determine the significance of the relationship between the students' level of environmental awareness and their sustainable practices (Table 5). The data showed a significant relationship between students' level of environmental awareness and their sustainable practices, specifically in the domains of eco-friendly behavior, green consumption habits, and active participation in sustainability programs. All the variables in this table showed statistically significant relationships with the sustainable practice indicators, with p-values less than .001, indicating a highly significant correlation between environmental awareness and sustainable practices.

The knowledge of environmental issues was significantly correlated with eco-friendly behavior ($r = 0.28$, $p < .001$), green consumption habits ($r = 0.37$, $p < .001$), and active participation in sustainability programs ($r = 0.47$, $p < .001$). These results suggested that students who were more informed about environmental problems, such as pollution, climate change, and deforestation, were more likely to demonstrate responsible behavior, make environmentally conscious purchases, and actively engage in sustainability programs. Knowledge provided the foundation for action, and students who understood the causes and consequences of environmental issues were more likely to behave in ways that mitigated environmental harm.

The concern for sustainability also showed significant relationships with eco-friendly behavior ($r = 0.47$, $p < .001$), green consumption habits ($r = 0.33$, $p < .001$), and active participation in sustainability programs ($r = 0.22$, $p < .001$). This implied that students who were more concerned about preserving the environment for future generations tended to engage more in sustainable actions. The relatively strong correlation with eco-friendly behavior highlighted that internalized concern translated directly into personal daily choices that favored the environment, such as conserving energy or reducing waste.

Similarly, attitudes toward environmental protection were significantly correlated with eco-friendly behavior ($r = 0.49$, $p < .001$), green consumption habits ($r = 0.46$, $p < .001$), and active participation in sustainability programs ($r = 0.32$, $p < .001$). These were the strongest correlations observed in the table, particularly for eco-friendly behavior. This meant that students with positive attitudes toward protecting the environment were more likely to act in environmentally friendly ways, choose sustainable products, and participate in programs promoting ecological responsibility. This finding supported the idea that attitude was a key driver of behavior, especially when it came to lifestyle changes and community involvement.

This aligned with the Theory of Planned Behavior (Ajzen, 1991), which emphasized that behavior was influenced by attitudes, subjective norms, and perceived behavioral control, all of which were supported by environmental knowledge. Individuals with higher environmental concern were more likely to adopt behaviors aligned with sustainability, especially those that benefited future generations (Schultz, 2001).

Environmental attitudes significantly predicted ecological actions, especially when reinforced by personal norms and perceived behavioral control. Thus, nurturing positive environmental attitudes through education, campaigns, and value formation was critical in encouraging students to translate concern into meaningful, everyday sustainability practices (Bamberg & Möser, 2007).

These findings implied that promoting environmental awareness among students could lead to more sustainable practices. Educators and school administrators should prioritize environmental education not only as content knowledge but also as a tool for shaping attitudes and values. Suggested activities included integrating environmental topics across subjects, organizing campus-wide sustainability campaigns, and facilitating student involvement in local ecological projects. Teachers could conduct reflective exercises, such as journaling or debates on environmental ethics, to nurture more profound concern for sustainability. By strengthening the cognitive, affective, and behavioral aspects of environmental awareness, educational institutions could produce learners who were both informed and actively engaged in building a sustainable future.

Table 5 Significant Relationship between the Students' Level of Environmental Awareness and their Sustainable Practices

Variables		Eco-friendly Behavior	Green Consumption Habits	Active Participation in Sustainability Programs
Knowledge of Environmental Issues	*r*	0.28	0.37	0.47
	p	<0.001	<0.001	<0.001
Concern for Sustainability	*r*	0.47	0.33	0.22
	p	<0.001	<0.001	<0.001

Attitudes Toward Environmental Protection	*r*	0.49	0.46	0.32
	p	<0.001	<0.001	<0.001

Notes: Ho: There is a highly significant relationship between the students' level of environmental awareness and their sustainable practices.

Probability Value Scale: *** p < .001 (Highly Significant);**p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

Regression Analysis on the Knowledge of Environmental Issues and Attitudes Toward Environmental Protection as Predictors of Students' Level of Sustainable Practices

Multiple linear regression analysis was conducted to determine which variables significantly predicted the students' level of sustainable practices. The analysis yielded p-values less than the .05 alpha level, indicating statistically significant results (Table 6). The results revealed that knowledge of environmental issues ($\beta = 0.27$, $t = 6.46$, $p < .001$) and attitudes toward environmental protection ($\beta = 0.43$, $t = 7.82$, $p < .001$) were significant predictors of sustainable practices among students.

The regression equation (Students' Sustainable Practices = 1.28 + 0.27 Knowledge of Environmental Issues + 0.43 Attitudes Toward Environmental Protection) indicated that for every one-unit increase in students' environmental knowledge, their level of sustainable practices increased by 0.27 units, assuming attitudes remained constant. Likewise, for every one-unit increase in students' positive attitudes toward environmental protection, their sustainable practices increased by 0.43 units. This suggested that while both factors were important, attitude had a more substantial influence on behavior, highlighting that students who internalized environmental values were more likely to consistently act in sustainable ways.

The overall model was statistically significant, $F(2, N) = 84.2$, $p < .001$, with an adjusted R^2 of 0.35, indicating that 35% of the variance in students' sustainable practices could be explained by the combined effects of environmental knowledge and attitude. The remaining 65% could be attributed to other unmeasured factors, such as access to sustainable options, peer influence, institutional support, or socioeconomic conditions. These findings implied that future research should explore other potential predictors that might influence sustainability behaviors among students.

Attitudes toward a behavior strongly influence the intention to act and thus predict actual behavior (Ajzen, 1991). Students with positive environmental attitudes were more likely to engage in sustainable behaviors, with knowledge enhancing the strength of this relationship (Choi & Lee, 2022). Similarly, individuals' environmental attitudes and awareness were key drivers in promoting sustainability, with knowledge acting as a facilitator that increases the motivation to act sustainably (Mol & Spaargaren, 2021).

Positive attitudes toward environmental protection and increased knowledge about environmental issues were strong predictors of students' sustainable behaviors (Dima & Novikova, 2023). Furthermore, pro-environmental attitudes formed through education programs that emphasize knowledge about ecological issues and sustainability significantly influenced the sustainability practices of students in secondary education (Gough & Gough, 2021). These findings emphasized the importance of both knowledge acquisition and attitude formation in fostering behaviors that contribute to environmental sustainability.

The results of this study underscored the importance of both environmental education and values formation in fostering sustainable practices among students. Therefore, school administrators, science educators, and curriculum planners were encouraged to consider integrating sustainability concepts and pro-environmental attitudes more intentionally into the curriculum. Activities such as eco-friendly school campaigns, experiential field trips to nature reserves, reflective journals on environmental issues, and classroom debates on sustainability policies could be used to nurture both knowledge and values.

Moreover, teacher training programs were recommended to include modules that emphasized environmental

issues and strategies to promote ecological responsibility in classroom instruction. Environmental clubs and student-led initiatives could also be supported to reinforce these concepts through peer collaboration, action-based learning, and community involvement. Shaping students' attitudes and awareness through both structured lessons and extracurricular activities could create a ripple effect, encouraging responsible behaviors that benefited not just the school community but the broader environment.

Table 6 Predictors of Students' Level of Sustainable Practices

Predictors	Coef (β)	SE Coef		t- value	p-value
(Constant)	1.28	0.25		5.00	<0.001
Knowledge of Environmental Issues	0.27	0.04		6.46	<0.001
Attitudes Toward Environmental Protection	0.43	0.06		7.82	<0.001
Adjusted r^2	0.35				
F value	84.2				
p-value	<0.001				
Students' Level of Sustainable Practices = 1.28 + 0.27* Knowledge of Environmental Issues + 0.43 * Attitudes Toward Environmental Protection					

Mediation Analysis on the Role of Environmental Awareness in the Relationship Between Science Literacy and Sustainable Practices

Table 7 presented the results of a mediation analysis that examined whether environmental awareness mediated the relationship between science literacy and sustainable practices among students. The analysis revealed that the total effect of science literacy on sustainable practices was statistically significant (B = 0.442, SE = 0.0524, 95% CI [0.3396, 0.545], Z = 8.44, p < .001). This result indicated that science literacy was a strong overall predictor of sustainable practices when both direct and indirect pathways were considered.

The indirect effect of science literacy on sustainable practices through environmental awareness was also statistically significant (B = 0.348, SE = 0.0469, 95% CI [0.2559, 0.440], Z = 7.42, p < .001). This indirect effect accounted for approximately 78.6% of the total effect, suggesting that environmental awareness played a substantial mediating role. Specifically, students with higher science literacy scores tended to exhibit greater environmental awareness, which in turn positively influenced their sustainable behaviors. Supporting this, the path from science literacy to environmental awareness was significant (r = 0.567, p < .001), indicating that scientifically literate students were more likely to be aware of environmental issues. In addition, environmental awareness significantly predicted sustainable practices (r = 0.613, p < .001), highlighting its essential role in motivating students to adopt environmentally responsible behaviors.

On the other hand, the direct effect of science literacy on sustainable practices was found to be statistically non-significant (B = 0.095, SE = 0.0628, 95% CI [-0.0287, 0.218], Z = 1.50, p = .133), accounting for only 21.4% of the total effect. This suggested that once environmental awareness was taken into account, the direct link between science literacy and sustainable practices became minimal. In other words, while science literacy contributed to sustainability, its influence was primarily channeled through environmental awareness. Students may have possessed knowledge of scientific facts and processes, but without being aware of the relevance and urgency of environmental issues, this knowledge alone did not translate strongly into action.

Additionally, parameter estimates were obtained, referring to the numerical values that had been assigned to the model's parameters and represented the relationships and influences among the variables. As depicted in the figure below, the researchers identified the direct, indirect, and total effects among the respective paths of variables, along with their path coefficients (β), p-values, and coefficients of determination (R^2). The direct effects of the latent variables were demonstrated through three primary paths: SL → EA (path a), EA → SP (path b), and SL → SP (path c). Specifically, path a denoted the effect of science literacy (SL) on environmental

awareness (EA), with a path coefficient of $\beta = 0.567$ and a statistically significant p-value of less than 0.001, indicating a strong positive relationship. Path b reflected the influence of environmental awareness (EA) on sustainable practices (SP), which yielded a standardized coefficient of $\beta = 0.613$ and a p-value less than 0.001, also showing a substantial and statistically significant effect. Meanwhile, path c, which represented the direct effect of SL on SP, excluding the mediation of EA, had a coefficient of $\beta = 0.095$ with a p-value of 0.133, suggesting that the relationship was not statistically significant. The R^2 value for EA was 0.32, which meant that approximately 32% of the variance in environmental awareness had been explained by science literacy. Similarly, the R^2 value for SP was 0.35, indicating that 35% of the variance in sustainable practices had been accounted for by both SL and EA combined.

Personal awareness and emotional connections to environmental issues were key drivers for translating knowledge into action (Kollmuss & Agyeman, 2021). This model, the Environmental Behavior Model, aligned with the findings that environmental awareness mediates the relationship between science literacy and sustainable practices. Similarly, the Theory of Planned Behavior (Ajzen, 1991) has been updated in recent studies to reflect how awareness, attitudes, and perceived behavioral control predict pro-environmental actions. Moreover, students with greater environmental awareness were more likely to engage in sustainable practices, confirming that awareness enhances the effectiveness of environmental education. Furthermore, integrating environmental education programs that focused on both cognitive and affective learning significantly increased students' willingness to participate in sustainability initiatives (DeLeo et al., 2022). This highlights the essential role of environmental awareness in connecting science literacy with responsible, sustainable behaviors, reaffirming the need for curricula that blend knowledge with an emotional and ethical commitment to the environment.

The findings of this mediation and path analysis had significant implications for educators, school leaders, and curriculum developers. Strengthening students' science literacy was undoubtedly crucial, but it needed to be paired with intentional efforts to deepen environmental awareness to fully realize its impact on sustainability. School administrators and curriculum planners were encouraged to embed environmental themes within science instruction and interdisciplinary projects. Teachers could adopt experiential and inquiry-based learning strategies that connected scientific concepts to local and global environmental challenges. For instance, integrating case studies on climate change, biodiversity, pollution, or water conservation into classroom discussions and activities helped students see the real-world relevance of what they were learning. Organizing hands-on activities like school gardening, waste segregation campaigns, or tree-planting initiatives also reinforced the link between knowledge and responsible action.

In addition, schools could collaborate with local government units, NGOs, and environmental experts to conduct seminars and workshops that expose students to real environmental issues affecting their communities. Student organizations and eco-clubs were empowered to take the lead in environmental campaigns within the school, promoting peer-to-peer engagement and advocacy. Also, engaging parents through school-community partnerships extended the impact of environmental awareness beyond the classroom and into the home.

The results of the mediation and path analysis highlighted that environmental awareness was a key mechanism that connected science literacy to sustainable practices. Educational programs, therefore, were encouraged to adopt a holistic approach that nurtured not just the cognitive aspect of science learning but also the affective dimension of environmental consciousness. This helped develop well-rounded learners who were both informed and motivated to protect the environment.

Table 7Mediation Analysis on the role of environmental awareness on the relationship between science literacy and sustainable practices

Effect			Label Estimate		SE	95% Confidence Interval				
						Lower	Upper	Z	p	% Mediation
Indirect			a x b	0.348	0.0469	0.2559	0.440	7.42	< .001	78.6

Direct			c	0.095	0.0628	-0.0287	0.218	1.50	0.133	21.4
Total			c+a x b	0.442	0.0524	0.3396	0.545	8.44	< .001	100.0
Path Estimates										
Level of Science Literacy	→	Environmental Awareness	a	0.567	0.0363	0.496	0.64	15.63	< .001	
Environmental Awareness	→	Sustainable Practices	b	0.613	0.0727	0.471	0.76	8.43	< .001	
Level of Science Literacy	→	Sustainable Practices	c	0.095	0.0628	-0.029	0.22	1.50	0.133	

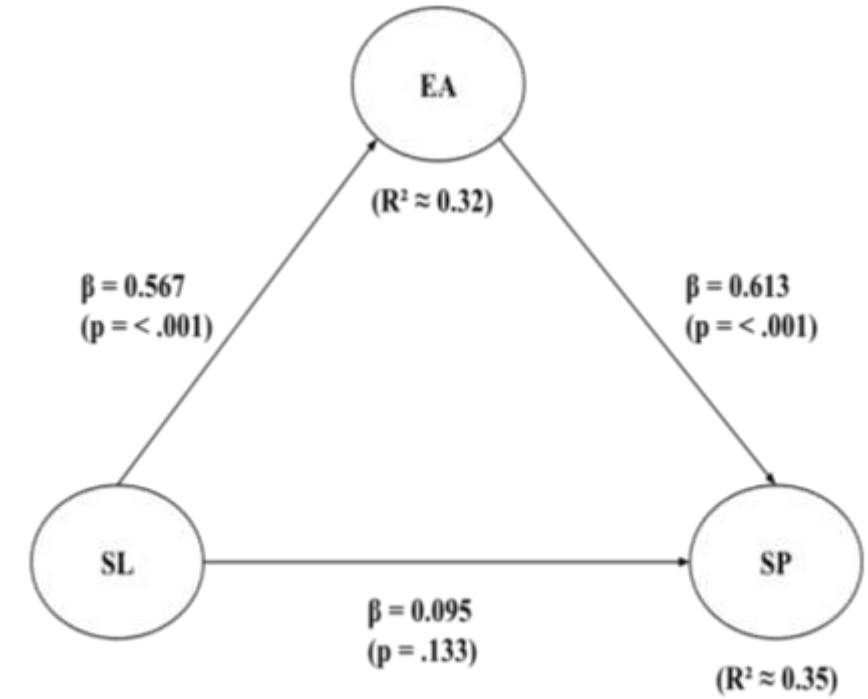

Figure 2. A model showing the overall paths with their respective path coefficient and p-values.

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study explored the mediating role of environmental awareness in the relationship between science literacy and sustainable practices among college students at a tertiary institution in Ozamiz City for the school year 2024-2025. The study aimed to examine the level of students' science literacy, environmental awareness, and sustainable practices. The study aimed to investigate several key objectives related to college students' science literacy, environmental awareness, and sustainable practices. Specifically, it sought to determine the level of science literacy of college students in terms of the science curriculum (SC), environmental science integration (ESI), and digital tools for environmental learning (DTEL). It also aimed to assess the level of students' environmental awareness in relation to their knowledge of environmental issues (KEI), concern for sustainability (CS), and attitudes toward environmental protection (ATEP). In addition, the study examined the students' sustainable practices, focusing on eco-friendly behavior (EB), green consumption habits (GCH), and active participation in sustainability programs (APSP). A descriptive-correlational research design was employed to gather the data. The respondents were chosen through stratified random sampling. Data were collected from 323 college students through three questionnaires: (1) Level of Science Literacy Questionnaire, (2) Students' Environmental Awareness Questionnaire, and (3) Students' Sustainable Practices Questionnaire. The data were

gathered through two approaches: online via Google Forms and in-person using printed questionnaires, with proper permissions and consent obtained from participants. The collected responses were organized and analyzed using Microsoft Excel and Jamovi software, and the results were presented in tabular form. Ethical guidelines were strictly followed in line with the Data Privacy Act of 2012. The statistical procedures included the computation of means, standard deviations, correlations among latent variables, and mediation analysis. The study also aimed to identify significant relationships between these factors and determine which independent variables predict sustainable practices among students.

Findings

The study revealed the following key findings:

1. The students demonstrated a high level of science literacy.
2. Students demonstrated a very high level of environmental awareness.
3. The students demonstrated excellent results in their sustainable practices; however, their
4. active participation in sustainable programs was only rated as good.
5. A significant positive relationship was found between science literacy and the students' sustainable practices suggest that higher science literacy contributed to better sustainable practices.
6. A significant positive relationship was also found between environmental awareness and sustainable practices indicate that students with higher levels of environmental awareness are more likely to engage in sustainable behaviors.
7. The study identified several independent variables, including the components of science literacy and environmental awareness predict students' sustainable practices either singly or in combination.

Conclusions

Based on the findings, the following conclusions can be drawn:

1. College students possess a high level of science literacy, particularly in areas that integrate environmental science into their learning and utilize digital tools to enhance environmental education.
2. Students' environmental awareness is solid, with strong knowledge of environmental issues, concern for sustainability, and positive attitudes toward environmental protection.
3. Students exhibit notable sustainable practices, showing a commitment to eco-friendly behavior, green consumption, and active participation in sustainability programs.
4. There is a clear connection between science literacy and students' sustainable practices, fostering science literacy can lead to improved sustainable behaviors.
5. Environmental awareness plays a key role in encouraging sustainable practices, with students who are more aware of environmental issues and sustainability demonstrate stronger engagement in sustainability initiatives.
6. Several factors, such as the components of science literacy and environmental awareness,significantly predict students' engagement in sustainable practices.

Recommendations

Based on the study's findings and conclusions, it is recommended that:

1. Strengthen the curriculum by embedding real-world environmental issues into science lessons to maintain and boost students' science literacy and awareness.
2. Utilize educational technology to enhance environmental learning and engagement among students.
3. Provide more opportunities for students to participate in eco-friendly practices and community-based sustainability programs.
4. Conduct regular seminars, webinars, and awareness drives to deepen students' understanding and concern for environmental issues.
5. Design programs that connect what students learn in class to practical, sustainableactions, reinforcing the impact of science literacy and awareness on behavior.
6. Focus on enhancing specific components of science literacy and environmental literacy.Awareness is the factor that most strongly influences sustainable practices.
7. Future researchers may explore the long-term impact of student participation in sustainability programs on their environmental attitudes and behaviors.

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APPENDIX A

SURVEY QUESTIONNAIRE (BLANK) LEVEL OF SCIENCE LITERACY

QUESTIONNAIRE

(Adopted from Siegel & Ranney, 2003 and Liu & Zhang, 2024)

Directions: The following are statements about your level of science literacy. Please indicate the extent to which each statement best describes you by clicking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	**5**	**4**	**3**	**2**	**1**
A. Science Curriculum					
1. Science class helps me to evaluate my own work.					
2. Science will help me understand more about world-wide problems.					
3. Science class helps me to judge other people's points of view.					
4. Science class helps me to work with others to make decisions.					

5. Science class will help prepare me for major decisions in my future.					
B. Environmental Science Integration					
1. Science will help me to understand the effect I have on the environment.					
2. Knowledge of science helps me to prevent the spread of colds / diseases.					
3. Science can help me make better decisions about what I buy.					
4. Science will help me understand the importance of recycling.					
5. Knowledge of science will help me protect the environment.					
C. Digital Tools for Environmental Learning					
1. The digital tools I use allow me to actively engage with environmental content.					
2. I am able to customize my learning experience about the environment using these digital tools					
3. I find that the digital tools provide a high level of interactivity when learning about environmental issues.					
4. The digital tools I use provide immediate feedback on my actions regarding environmental education.					

STUDENTS' ENVIRONMENTAL AWARENESS QUESTIONNAIRE

(Adopted from Rogayan Jr. & Nebrida, 2019)

Directions: The following are statements about your level of environmental awareness. Please indicate the extent to which each statement best describes you by clicking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	**5**	**4**	**3**	**2**	**1**
A. Knowledge of Environmental Issues					
1. Governmental and non-governmental organizations of our country in respect to the environment.					
2. I attended any project or seminar to acknowledge environmental awareness.					
3. It is necessary for all university students to take subjects related to environmental awareness.					
4. Discuss with friends and relatives about environmental issues and concerns that confront the community and the country as a whole.					
5. Deliver a talk or discourse about environmental literacy to heighten the awareness of the people.					

B. Concern for Sustainability					
1. Adolescent should have good environmental awareness for a sustainable environment.					
2. I think the choice of public transport is important for a sustainable environment.					
3. Promotion of renewable energy resources is necessary for a sustainable environment.					
4. Promotion of energy saving is important for a sustainable environment.					
5. Support initiatives and programs on environmental conservation like the National Greening Program of the present administration.					
C. Attitudes Toward Environmental Protection					
1. I always show my best efforts to prevent pollution of the environment and show awareness.					
2. Recycling of waste is important for the protection of the environment and natural resources.					
3. Collection of waste in separate dustbins is important for a sustainable environment.					
4. Separate collection dustbins (plastic, metal, etc.) in buildings are important for a sustainable environment.					
5. Avoid throwing garbage anywhere and learn the science of segregation of solid waste.					

STUDENTS' SUSTAINABLE PRACTICES QUESTIONNAIRE

(Adopted from Rogayan Jr. & Nebrida, 2019)

Directions: The following are statements about your level of sustainable practices. Please indicate the extent to which each statement best describes you by clicking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	**5**	**4**	**3**	**2**	**1**
A. Eco-friendly Behavior					
1. Turn off the lights and unplug appliances when not in use to save electricity.					
2. To prevent unnecessary use of energy, I use light and electric devices only when needed.					
3. I keep my computer and printer off when I'm not using them to save energy.					
4. When I leave a room/place, I check if there is anyone to turn off the lights.					
5. Use reusable water bottles or tumblers instead of buying bottled water in the canteen or stores.					

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B. Green Consumption Habits					
1. Avoid the use of plastic and styrofoam, which cause harm not only to the environment but also to human health.					
2. Keep good food ethics and avoid eating with leftovers and wasting drinking water.					
3. Lessen the use of detergents as they tend to create foam in gutters and in sewage-disposal plants, even appearing in natural water sources.					
4. Practice the science of composting to improve soil and enhance plant growth.					
5. Recycle and reuse non-biodegradable materials to lessen solid waste.					
C. Active Participation in Sustainability Programs					
1. Organize an environmental forum or symposium with fellow youth and community members.					
2. Ask for media support in exposing environmental anomalies and irregularities.					
3. Volunteer with organizations that help preserve and conserve the environment.					
4. Encourage everyone, especially fellow youth, to be ambassadors of the environment.					
5. Lobby for relevant laws on environmental conservation with political leaders.					

APPENDIX B

SAMPLE OF THE FILLED-OUT QUESTIONNAIRE

Name: MARIBE ROSE M. MAGLANGIT
Age: 19
Gender: F
College / Department: CAF
Program & Major: _____
Year Level: 2
Science-related courses enrolled this SY 2024-2025: ANIMAL SCIENCE, CROP SCIENCE, BIOCHEM

LEVEL OF SCIENCE LITERACY QUESTIONNAIRE

Directions: The following are statements about your level of science literacy. Please indicate the extent to which each statement best describes you by checking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	5	4	3	2	1
A. Science Curriculum					
1. Science class helps me to evaluate my own work.			✓		
2. Science will help me understand more about world-wide problems.	✓				
3. Science class helps me to judge other people's points of view.			✓		
4. Science class helps me to work with others to make decisions.		✓			
5. Science class will help prepare me for major decisions in my future.		✓			
B. Environmental Science Integration					
1. Science will help me to understand the effect I have on the environment.	✓				
2. Knowledge of science helps me to prevent the spread of colds / diseases.	✓				
3. Science can help me make better decisions about what I buy.		✓			
4. Science will help me understand the importance of recycling.	✓				
5. Knowledge of science will help me protect the environment.	✓				
C. Digital Tools for Environmental Learning					
1. The digital tools I use allow me to actively engage with environmental content.		✓			
2. I am able to customize my learning experience about the environment using these digital tools	✓				
3. I find that the digital tools provide a high level of interactivity when learning about environmental issues.		✓			
4. The digital tools I use provide immediate feedback on my actions regarding environmental education.		✓			

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STUDENTS' ENVIRONMENTAL AWARENESS QUESTIONNAIRE

Directions: The following are statements about your level of environmental awareness. Please indicate the extent to which each statement best describes you by checking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	5	4	3	2	1
A. Knowledge of Environmental Issues					
1. Governmental and non-governmental organizations of our country in respect to the environment.		✓			
2. I attended any project or seminar to acknowledge environmental awareness.		✓			
3. It is necessary for all university students to take subjects related to environmental awareness.	✓				
4. Discuss with friends and relatives about environmental issues and concerns that confront the community and the country as a whole.	✓				
5. Deliver a talk or discourse about environmental literacy to heighten the awareness of the people.		✓			
B. Concern for Sustainability					
1. Adolescent should have good environmental awareness for a sustainable environment.	✓				
2. I think the choice of public transport is important for a sustainable environment.	✓				
3. Promotion of renewable energy resources is necessary for a sustainable environment.	✓				
4. Promotion of energy saving is important for a sustainable environment.	✓				
5. Support initiatives and programs on environmental conservation like the National Greening Program of the present administration.	✓				
C. Attitudes Toward Environmental Protection					
1. I always show my best efforts to prevent pollution of the environment and show awareness.				✓	
2. Recycling of waste is important for the protection of the environment and natural resources.		✓			
3. Collection of waste in separate dustbins is important for a sustainable environment.		✓			
4. Separate collection dustbins (plastic, metal, etc.) in buildings are important for a sustainable environment.		✓			
5. Avoid throwing garbage anywhere and learn the science of segregation of solid waste.		✓			

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STUDENTS' SUSTAINABLE PRACTICES QUESTIONNAIRE

Directions: The following are statements about your level of sustainable practices. Please indicate the extent to which each statement best describes you by checking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	5	4	3	2	1
A. Eco-friendly Behavior					
1. Turn off the lights and unplug appliances when not in use to save electricity.	✓				
2. To prevent unnecessary use of energy, I use light and electric devices only when needed.	✓				
3. I keep my computer and printer off when I'm not using them to save energy.	✓				
4. When I leave a room/place, I check if there is anyone to turn off the lights.	✓				
5. Use reusable water bottles or tumblers instead of buying bottled water in the canteen or stores.	✓				
B. Green Consumption Habits					
1. Avoid the use of plastic and styrofoam, which cause harm not only to the environment but also to human health.	✓				
2. Keep good food ethics and avoid eating with leftovers and wasting drinking water.	✓				
3. Lessen the use of detergents as they tend to create foam in gutters and in sewage-disposal plants, even appearing in natural water sources.		✓			
4. Practice the science of composting to improve soil and enhance plant growth.	✓				
5.Recycle and reuse non-biodegradable materials to lessen solid waste.	✓				
C. Active Participation in Sustainability Programs					
1. Organize an environmental forum or symposium with fellow youth and community members.			✓		
2. Ask for media support in exposing environmental anomalies and irregularities.		✓			
3. Volunteer with organizations that help preserve and conserve the environment.		✓			
4. Encourage everyone, especially fellow youth, to be ambassadors of the environment.		✓			
5. Lobby for relevant laws on environmental conservation with political leaders.		✓			

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Name: _____ College / Department: Agriculture
Age: 18 Program & Major: BSAG
Gender: M Year Level: 2.
Science-related courses enrolled this SY 2024-2025: Animal Science

LEVEL OF SCIENCE LITERACY QUESTIONNAIRE

Directions: The following are statements about your level of science literacy. Please indicate the extent to which each statement best describes you by clicking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	5	4	3	2	1
A. Science Curriculum					
1. Science class helps me to evaluate my own work.	✓				
2. Science will help me understand more about world-wide problems.		✓			
3. Science class helps me to judge other people's points of view.	✓				
4. Science class helps me to work with others to make decisions.	✓				
5. Science class will help prepare me for major decisions in my future.	✓				
B. Environmental Science Integration					
1. Science will help me to understand the effect I have on the environment.	✓				
2. Knowledge of science helps me to prevent the spread of colds / diseases.	✓				
3. Science can help me make better decisions about what I buy.		✓			
4. Science will help me understand the importance of recycling.	✓				
5. Knowledge of science will help me protect the environment.	✓				
C. Digital Tools for Environmental Learning					
1. The digital tools I use allow me to actively engage with environmental content.		✓			
2. I am able to customize my learning experience about the environment using these digital tools		✓			
3. I find that the digital tools provide a high level of interactivity when learning about environmental issues.		✓			
4. The digital tools I use provide immediate feedback on my actions regarding environmental education.		✓			

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STUDENTS' ENVIRONMENTAL AWARENESS QUESTIONNAIRE

Directions: The following are statements about your level of environmental awareness. Please indicate the extent to which each statement best describes you by clicking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

Constructs/Indicators	5	4	3	2	1
A. Knowledge of Environmental Issues					
1. Governmental and non-governmental organizations of our country in respect to the environment.		✓			
2. I attended any project or seminar to acknowledge environmental awareness.		✓			
3. It is necessary for all university students to take subjects related to environmental awareness.		✓			
4. Discuss with friends and relatives about environmental issues and concerns that confront the community and the country as a whole.		✓			
5. Deliver a talk or discourse about environmental literacy to heighten the awareness of the people.		✓			
B. Concern for Sustainability					
1. Adolescent should have good environmental awareness for a sustainable environment.		✓			
2. I think the choice of public transport is important for a sustainable environment.		✓			
3. Promotion of renewable energy resources is necessary for a sustainable environment.		✓			
4. Promotion of energy saving is important for a sustainable environment.		✓			
5. Support initiatives and programs on environmental conservation like the National Greening Program of the present administration.	✓				
C. Attitudes Toward Environmental Protection					
1. I always show my best efforts to prevent pollution of the environment and show awareness.	✓				
2. Recycling of waste is important for the protection of the environment and natural resources.	✓				
3. Collection of waste in separate dustbins is important for a sustainable environment.	✓				
4. Separate collection dustbins (plastic, metal, etc.) in buildings are important for a sustainable environment.	✓				
5. Avoid throwing garbage anywhere and learn the science of segregation of solid waste.	✓				

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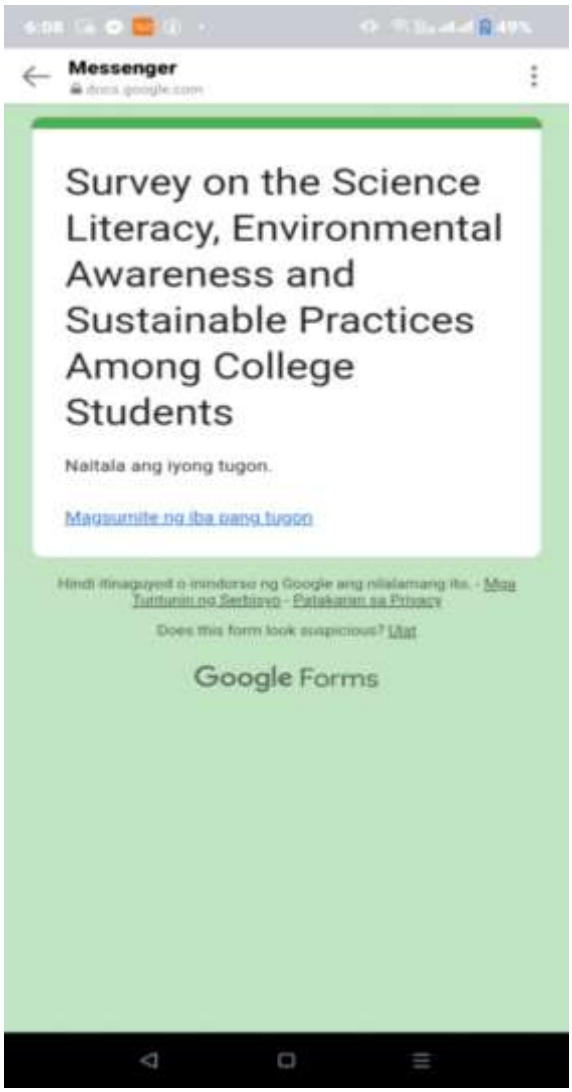
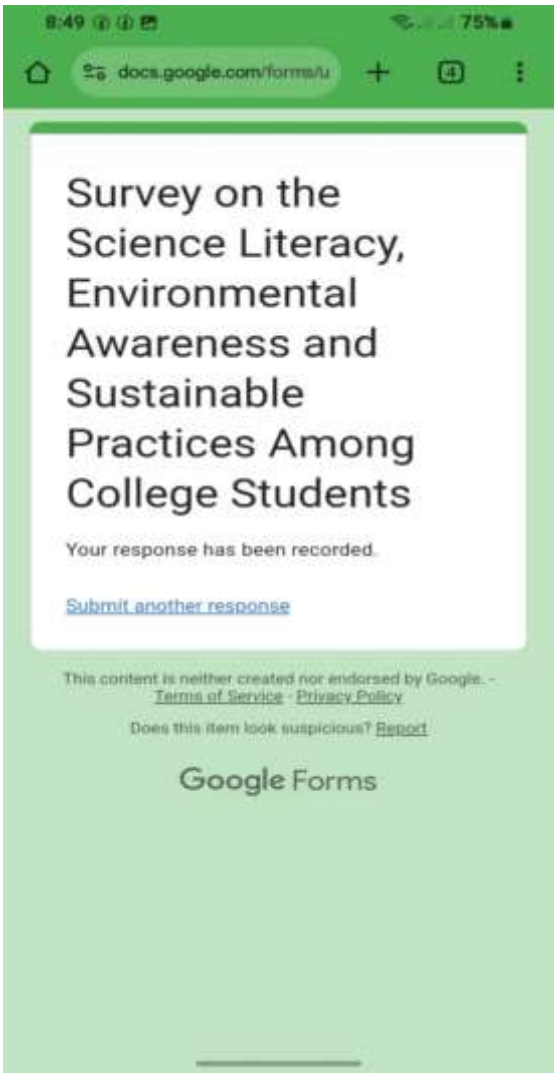
STUDENTS' SUSTAINABLE PRACTICES QUESTIONNAIRE

Directions: The following are statements about your level of sustainable practices. Please indicate the extent to which each statement best describes you by clicking the appropriate response: 5-Always; 4-Often; 3-Sometimes; 2-Seldom; 1-Never.

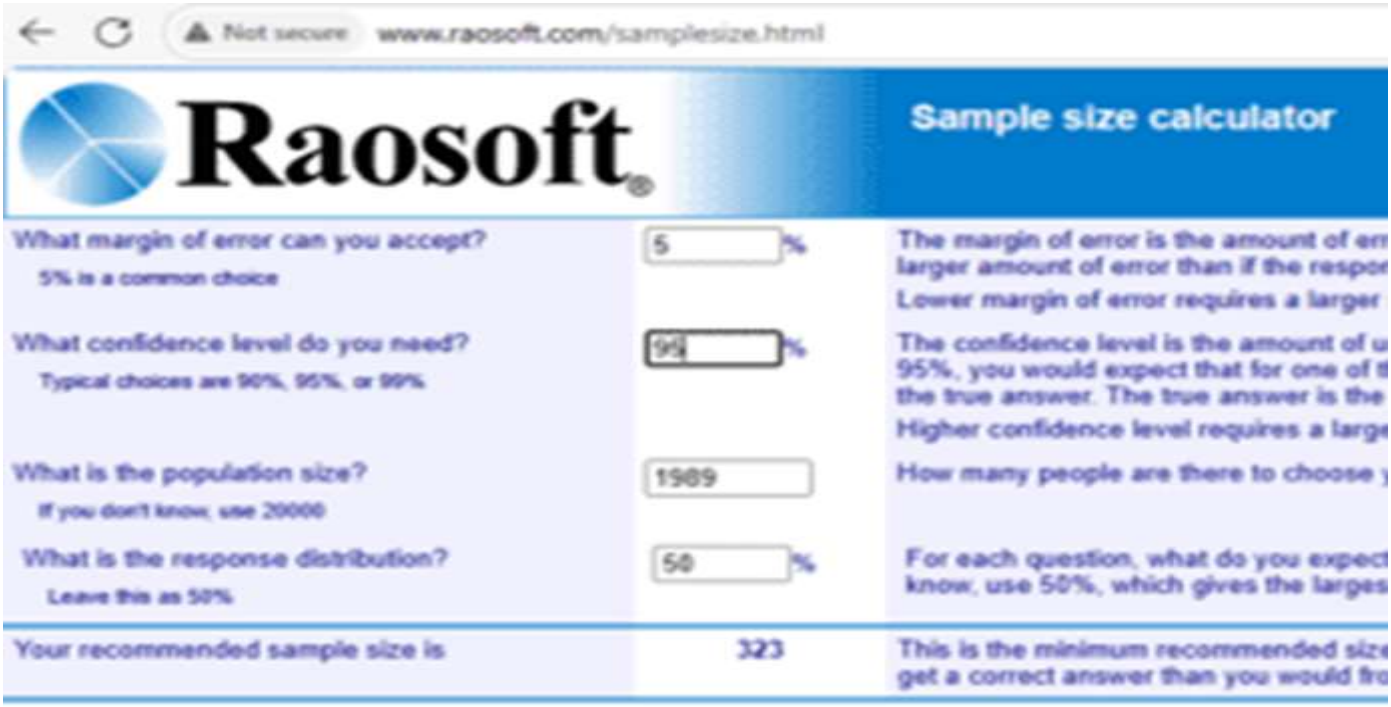
Constructs/Indicators	5	4	3	2	1
A. Eco-friendly Behavior					
1. Turn off the lights and unplug appliances when not in use to save electricity.		✓			
2. To prevent unnecessary use of energy, I use light and electric devices only when needed.		✓			
3. I keep my computer and printer off when I'm not using them to save energy.			✓		
4. When I leave a room/place, I check if there is anyone to turn off the lights.		✓			
5. Use reusable water bottles or tumblers instead of buying bottled water in the canteen or stores.		✓			
B. Green Consumption Habits					
1. Avoid the use of plastic and styrofoam, which cause harm not only to the environment but also to human health.	✓				
2. Keep good food ethics and avoid eating with leftovers and wasting drinking water.	✓				
3. Lessen the use of detergents as they tend to create foam in gutters and in sewage-disposal plants, even appearing in natural water sources.	✓				
4. Practice the science of composting to improve soil and enhance plant growth.	✓				
5.Recycle and reuse non-biodegradable materials to lessen solid waste.	✓				
C. Active Participation in Sustainability Programs					
1. Organize an environmental forum or symposium with fellow youth and community members.			✓		
2. Ask for media support in exposing environmental anomalies and irregularities.			✓		
3. Volunteer with organizations that help preserve and conserve the environment.	✓		.		
4. Encourage everyone, especially fellow youth, to be ambassadors of the environment.	✓				
5. Lobby for relevant laws on environmental conservation with political leaders.			✓		





APPENDIX C

SAMPLING COMPUTATION



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APPENDIX D

INFORMED CONSENT FORM

1. I volunteer to participate in the research undertaking to be conducted by *Maica Joy M. Eleccion and Lily Glaiza C. Gallo* from the College of Education, Misamis University. I understand that the research is designed to gather information about the level of science literacy. I will be one of the respondents to answer the research survey.

2. My participation in this research is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty. If I decline to participate or withdraw from the study, no one will be told.

3. This research will involve my participation. If, however, I feel uncomfortable in any way during answering the survey questionnaire, I have the right to decline my participation.

4. Answering the survey will take approximately 5-10 minutes.

5. I understand that the information to be gathered will be treated with confidentiality. I will not be identified in the paper. Only the researcher and their adviser will have access to the data of the research.

6. I understand that this research has been reviewed and approved by the College of Education of Misamis University.

7. I have read and understood the purpose of the study. I voluntarily agree to participate in this study.

Respondent's Signature Date

For further information, please contact:

Maica Joy M. Eleccion

Contact #: 09460941391

Email: eleccionmaicajoy@gmail.com

Lily Glaiza C. Gallo

Contact #: 09361618682

Email: lilyglaizagallo@gmail.com

119

INFORMED CONSENT FORM

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6. I understand that this research has been reviewed and approved by the College of Education of Misamis University.

7. I have read and understood the purpose of the study. I voluntarily agree to participate in this study.

Respondent's Signature

MARCH 21, 2025
Date

For further information, please contact:

Maica Joy M. Eleccion

Contact #: 09460941391

Email: eleccionmaicajoy@gmail.com

Lily Glaiza C. Gallo

Contact #: 09361618682

Email: lilyglaizagallo@gmail.com

INFORMED CONSENT FORM

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6. I understand that this research has been reviewed and approved by the College of Education of Misamis University.

7. I have read and understood the purpose of the study. I voluntarily agree to participate in this study.

Respondent's Signature

03-26-25
Date

For further information, please contact:

Maica Joy M. Eleccion

Contact #: 09460941391

Email: eleccionmaicajoy@gmail.com

Lily Glaiza C. Gallo

Contact #: 09361618682

Email: lilyglaizagallo@gmail.com

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Appendix F

Approved Letters Of Consent

March 03, 2025

Mrs. Nelpa N. Capio
Director, DSAS
Misamis University
Ozamiz City

Dear Mrs. Capio:

Greetings!

We are currently pursuing our thesis writing for our subject Sci 4Ed - Research in Teaching Science under the program, Bachelor of Secondary Education major in Science at Misamis University, Ozamiz City. Our research is entitled **"Assessing the Relationship between Science Literacy, Environmental Awareness, and Sustainable Practices Among College Students"** was approved by our research teacher on February 24, 2025.

This study is designed to assess the relationship between science literacy, environmental awareness, and sustainable practices among college students. Using the questionnaires as instruments, we will gather data from 323 students who are taking one of the science-related courses in the current semester. In this regard, we would like to request your approval for the conduct of our study. Please be assured that ethical considerations will be duly observed and the data will be utilized for this research purposes only.

Your approval to this request will be deeply appreciated.

Respectfully yours,

MAICA JOY M. ELECCION
Student

LILY GLAIZA C. GALLO
Student

Noted by:

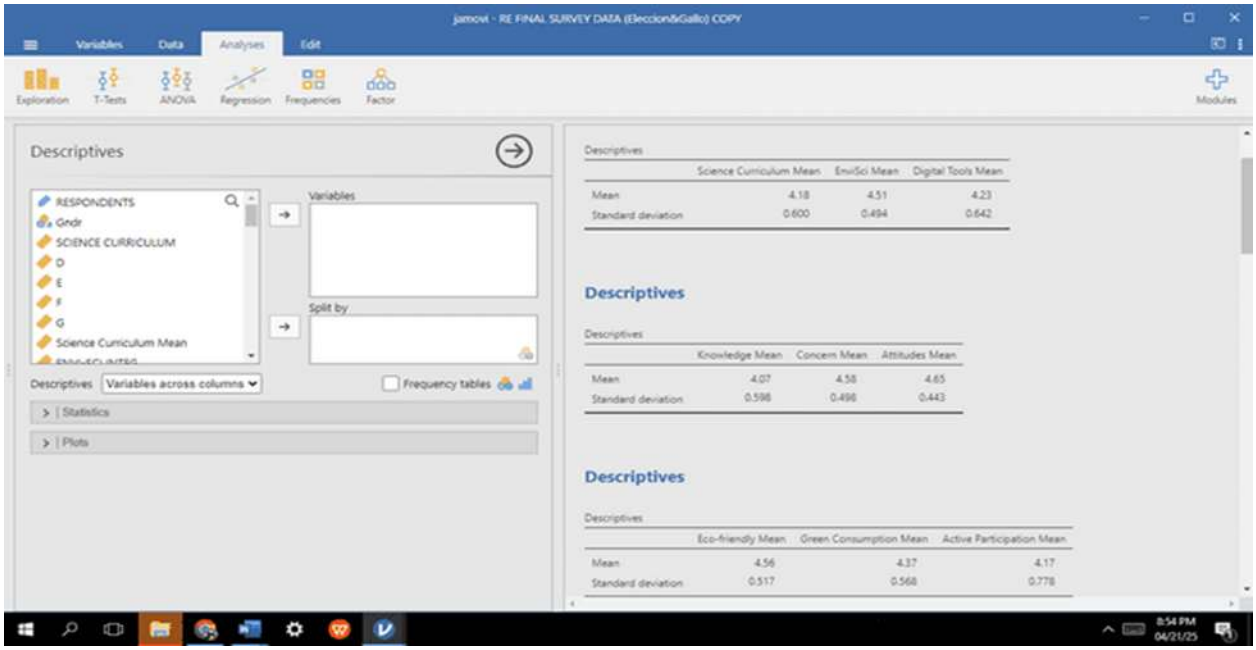
GENELYN R. BALUYOS, EdD
Science 4Ed Instructor

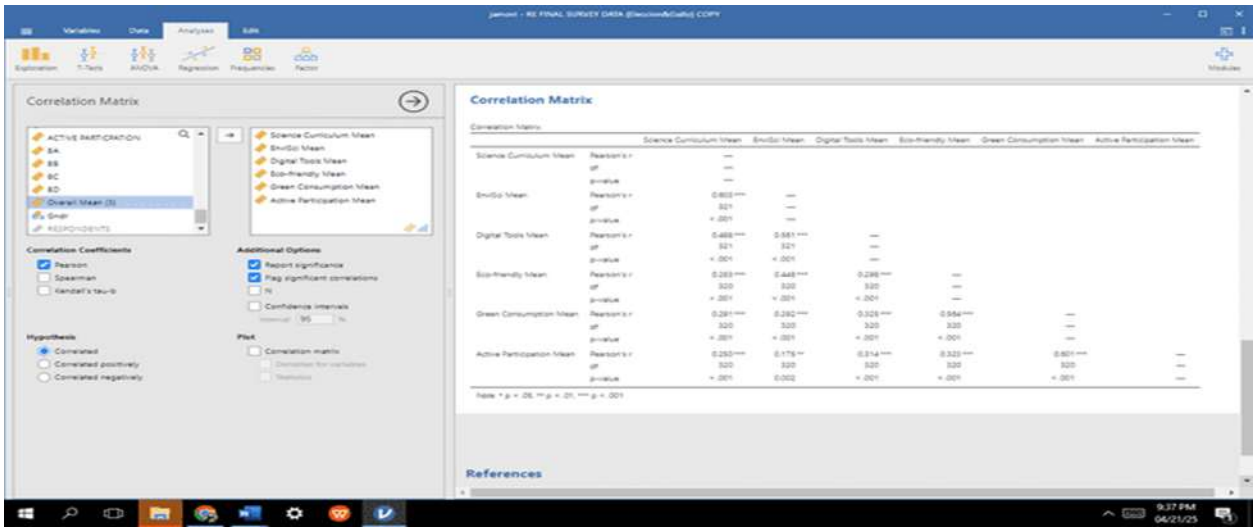
Approved by:

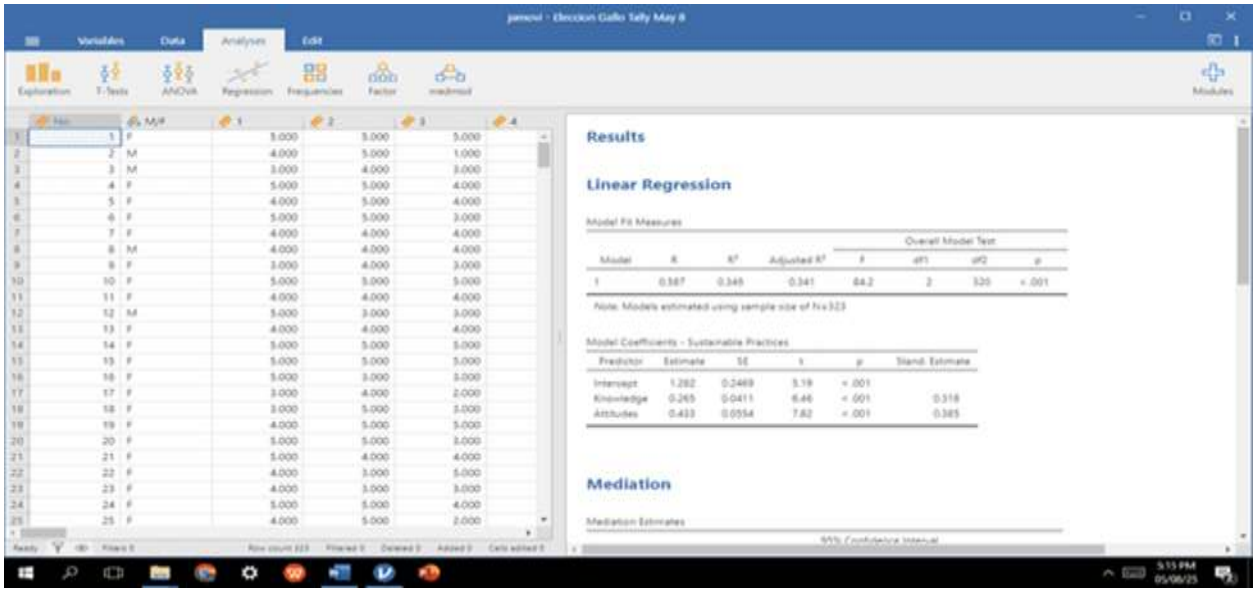
NELPA N. CAPIO
Director, DSAS

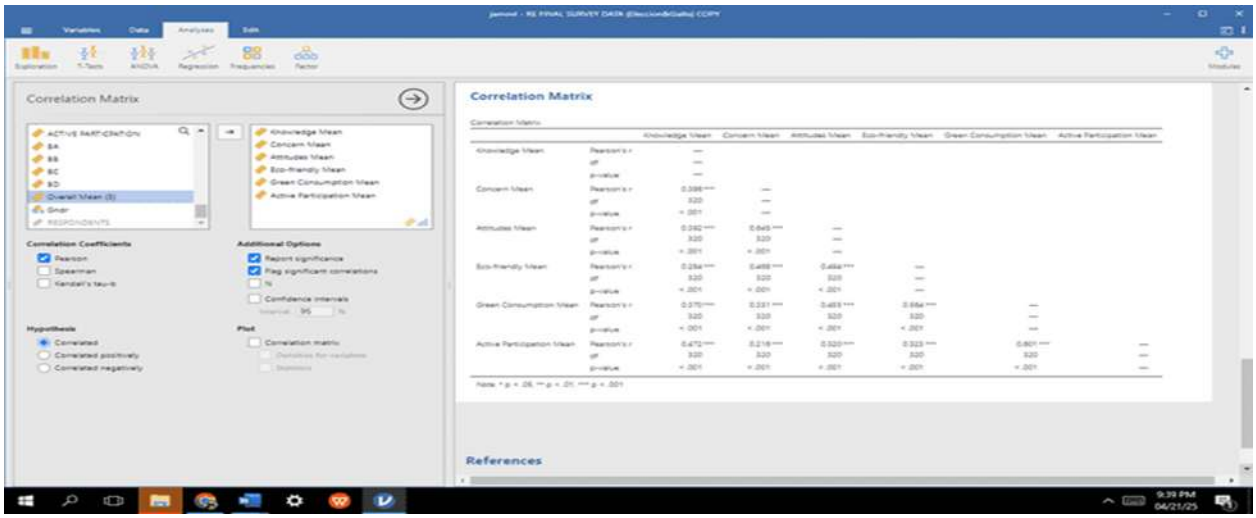
Appendix G

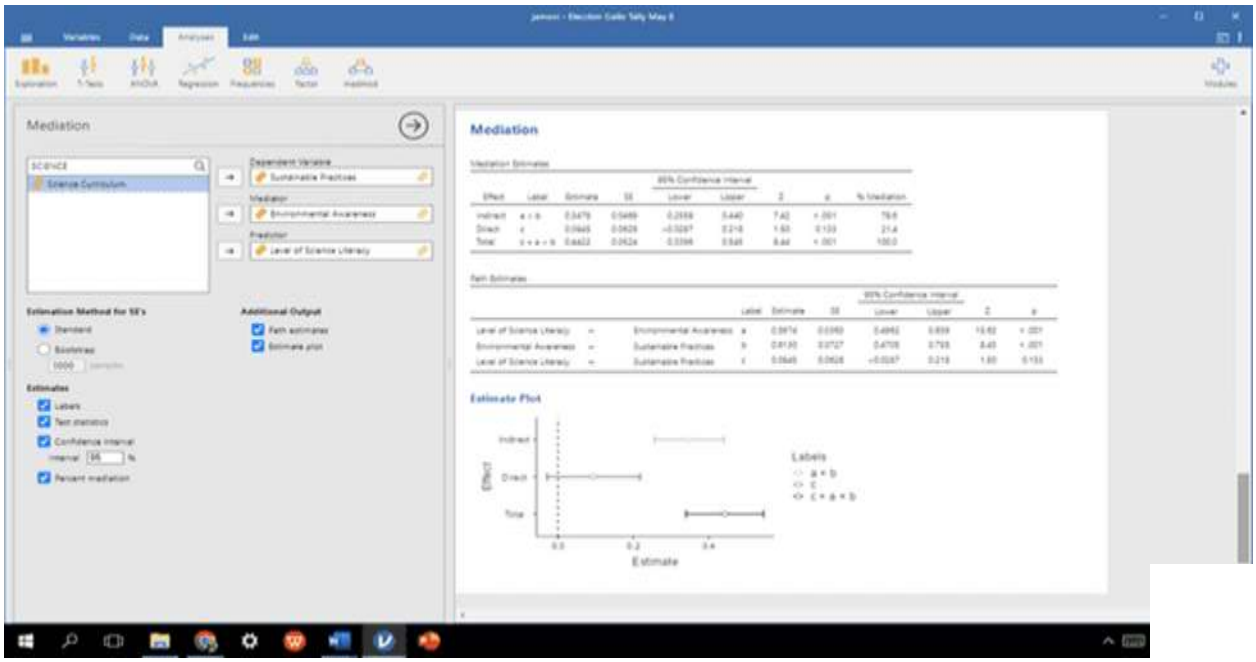
Statistical Computations











APPENDIX I

DOCUMENTATIONS

CURRICULUM VITAE

PERSONAL DATA

Name : Maica Joy M. Eleccion

Address : P-5, Tabid, Ozamiz City, Misamis Occidental

Date of Birth : April 20, 2003

Place of Birth : Ozamiz City, Misamis Occidental

Sex : Female

Civil Status : Single

Parents : Mr. & Mrs. Marcelino N. Eleccion Jr.

EDUCATION

College : Bachelor of Secondary Education Major in Science

Misamis University

H.T. Feliciano St, Ozamiz City, Misamis Occidental

Secondary : Senior High School

Misamis University

Ozamiz City, Misamis Occidental

June 2021-2022

Junior High School

Tabid National High School

Tabid, Ozamiz City, Misamis Occidental

April 2019-2020

Elementary : Diego Tuastomban Elementary School

Litapan, Ozamiz City, Misamis Occidental

April 2015-2016

CURRICULUM VITAE

PERSONAL DATA

Name : Lily Glaiza C. Gallo

Address : P-8, Catadman, Ozamiz City, Misamis Occidental

Date of Birth : May 1, 2002

Place of Birth : Bugo, Cagayan de Oro City, Misamis Oriental

Sex : Female

Civil Status : Single

Parents : Mr. and Mrs. Loel V. Gallo

EDUCATION

College : Bachelor of Secondary Education Major in Science

Misamis University

H.T. Feliciano St, Ozamiz City, Misamis Occidental

Secondary : Senior High School

Ozamiz City National High School

Ozamiz City, Misamis Occidental

June 2020-2021

Junior High School

Saint Bernard School of Toledo City

Sangi, Toledo City, Cebu

April 2018-2019

Elementary : North City Central School

Luray II, Toledo City, Cebu

April 2014-2015