AWARENESS AND PRACTICES OF SENIOR HIGH SCHOOL STUDENTS AND TEACHERS ON ENVIRONMENTAL EDUCATION: BASIS FOR INSTRUCTIONAL MATERIALS DEVELOPMENT

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

ABSTRACT

Environmental education in the Philippines has been incorporated into different course curricula, including life and physical sciences. This study evaluated the awareness and practices of senior high school students and teachers in environmental education. The study included 125 senior high school students and 25 teachers from Montevista Stand Alone Senior High School. The study found that 44% of the teacher-respondents were between 41-50 years old, while 51.20% of the student-respondents were between 17-18 years old. The teacher-respondents demonstrated a high level of awareness in environmental concepts and the state of the environment, with an overall mean of 4.34. The student-respondents showed a moderate level of awareness, with an overall mean of 3.18. The teacher-respondents "always" practiced taking action to solve environmental problems, with an overall mean of 4.52, while the student-respondents "often" did so, with an overall mean of 3.80. No statistically significant difference was found in the level of awareness of environmental concepts and the state of the environment among teachers when grouped according to gender (p-value = 0.207) or grade level taught (p-value = 0.910). Similarly, for students, no statistically significant difference was found when grouped according to grade level (p-value = 0.162) or age (p-value = 0.213). The awareness of environmental concepts was significantly and positively related to the need for a high degree of commitment among both teachers (r=0.455; p=0.022) and students (r=0.885; p=0.000). Based on the findings, the researcher recommends developing instructional materials for environmental education that aim to maintain and increase students' understanding and capacities in relation to environmental problems and environmental sustainability principles.

Keywords: Environmental Education, Awareness, Practices, Students, Teachers

1. INTRODUCTION

1.1 Background of the Study

"One of the most prominent trends of the last two decades is the growing concern about environmental issues and its impact on general understanding" (Sivamoorthy et al., 2013). "The increasing depletion of the earth's natural resources and the growing degradation of the ecosystem are unavoidable realities. These are the dire situations that endanger both man and the planet's existence" (Marpa &Juele, 2016).

"Education is an essential instrument for sustainable development, according to the United Nations Educational, Scientific, and Cultural Organization (UNESCO Education)'s for Sustainable Development. Environmental education is a process aimed at creating a global population that is aware of and concerned about the entire environment and its problems, as well as having the knowledge, attitudes, commitments, and skills to work individually and collectively to solve current issues and prevent new ones" (Puri & Joshi, 2017).

"In an attempt to address the myriad environmental concerns, in collaboration with the Department of Environment and Natural Resources (DENR), the Department of Science and Technology (DOST), and other relevant agencies, the Department of Education (DepEd), the Commission on Higher Education (CHED), and the Technical Education and Skills Development Authority (TESDA) lead the implementation of public education and awareness programs on environmental protection and conservation in consultation with environmental experts and the academe" (RA 9512, 2008).

"Furthermore, unlike other Southeast Asian countries, the current curriculum emphasizes the integration of environmental education into other courses such as life and physical sciences, social studies, geography, civics, and moral education, rather than treating it as a separate subject" (ADB, 2009).

Since schools offers better avenue for teaching and learning process and promotion of environmental education. It will impart to a critical aspect of the knowledge and awareness, and of the stakeholders (both students and teachers) for the environmental education. While almost all the previous studies conducted are focused only in describing the extent of environmental awareness and practices of the students, the present study looked into the environmental awareness and practices of Senior High School students and teachers as a prime mover in assessing the strength and weakness of the respondents towards environmental education as an input in formulating concepts that incorporates a strong backgrounds and actions in crafting instructional materials that can be used in strengthening environmental education.

1.2 Theoretical Framework

This study was based on the Confluent Theory of education and the Affective-Cognitive Experiences for Self-Integration Approach (ACES) (1994), which is predicated on the concurrent development of the learner's affective and cognitive dimensions. According to Francke & Erkens (1994), “the latter paradigm is put out as a means of bridging the divide between the cognitive and emotive domains. The integration of four overlapping regions in a learning process was the focus of attention (readiness, the cognitive domain, the affective domain, and responsibility)”. Confluent education was first described as a "streaming together" of the cognitive and emotional domains in the 1960s and 1970s, but it has since developed into a variety of learning dimensions (Solomon, 2000).

“Deep learning is accomplished in a confluent model by promoting self-awareness and personal accountability as well as by comprehending the dynamics of planned change. Both cognitive and affective objectives can be met by selecting from a wide range of instructional approaches in any given subject area”, according to Cline (1999). “The best strategy concentrates on reasoning-based dialogue and problem solving in an environment of openness, tolerance, and consideration for others” (Vare, 1979).

“The territory around the circumstances in which anything exists are equal to the environment in the broadest sense. It is made up of the natural resources that contribute to and sustain life on Earth, including water, air, rocks, soil, and sediments. Humans must use and alter certain aspects of nature in order to exist, unaware that their interference would have a multiplicity of impacts, the majority of which are unanticipated” (Oebanda, 2009). “The concept of sustainable development has permeated society ever since the release of Our Common Future (World Commission on Environment and Development, 1987) and Agenda 21 (United Nations Conference on Environment and Development, 1992)” (Terlevic et al., 2015).

Along these lines, the Montevista Stand Alone Senior High School, a public institution of higher learning, has emphasized the value of environmental friendliness in both its curriculum and co-curricular programs. Several factors, including environmental attitude, environmental awareness, and environmental sensitivity were looked at within the context of scientific investigations relating to the environment. When the relevant literature was evaluated, it became clear that there aren't many researches trying to figure out how conscious teachers and learners are of the surroundings in general.

“Environmental awareness has grown over time, preparing the stage for the establishment of environmental policies, which were then followed by legal guidelines, development strategies, and governmental initiatives” (Keles, 2002). “It was predicated that greater environmental awareness fosters conscientious behavior. According to some researchers, senior high students who took environmental classes shown more responsible environmental behavior and a greater awareness of environmental issues” (Bradley, et al., 1999; Kassas, 2002; Stevenson, 2007; Carleton-Hug & Hug, 2010). “Background knowledge, such as age and sex differences, is necessary for the effective design of environmental education programs that aim to improve children's environmental consciousness in a pro-environmental direction” (Liefländer& Bogner, 2014). (Roto, 2014). According to research by Roto (2014), “sex is a significant factor that may influence how much a pupil is conscious of the surroundings”.

Also, in the study conducted by Oebanda, (2009) she has concluded that “there was a significant difference in students’ environmental knowledge and sensitivity across degree programs or courses. In

the context of this study, the researcher evaluated the level of environmental awareness and practices of the senior high school students and teachers".

1.3 Conceptual Framework of the Study

The awareness and practices of the senior high school students and teachers on Environmental Education were determined in Montevista Stand Alone Senior High School, Montevista, Davao de Oro. The result of the study would provide instructional materials on environmental education.

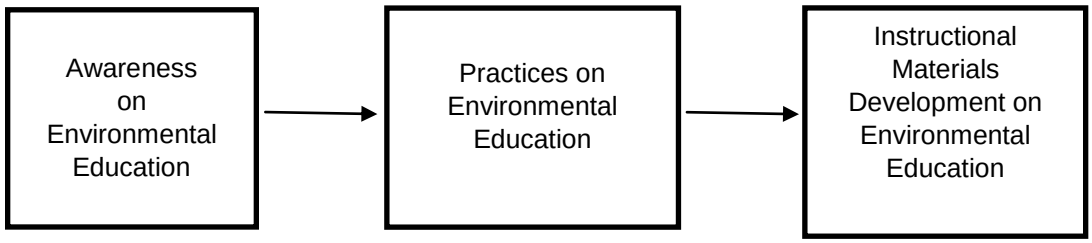

Figure 1. Schematic Diagram of the study on Evaluating the Awareness and Practices of Senior High School Students and Teachers on Environmental Education.

1.4 Statement of the Problem

Since the awareness and practices of senior high school students and teachers on Environmental Education would be an important factor for long-term conservation. Intervention on Environmental Education through widest dissemination and campaign must be done to know the level of knowledge and awareness among the participants.

Specifically, it attempted to answer the following questions:

1. What is the demographic profile of the respondents in terms of:
    1.1. age
    1.2. gender
    1.3. grade level (if student);
    1.4. grade level taught (if teacher); and
    1.5. strand?
2.What is the level of awareness of the students and teachers on Environmental Education in terms of:
    2.1. environmental concepts and the state of environment; and
    2.2. environmental issues and problems?
3. What is the extent of environmental practices of the students and teachers on Environmental Education in terms of:
    3.1. needs to take actions to solve environmental problems; and
    3.2. needs to possess a high degree of commitment?
4. Are there significant differences in the level of awareness and extent of environmental practices on environmental education among senior high school students when grouped according to their demographic profile?
5. Is there a significant correlation between the level of environmental awareness and extent practices of the students and teachers?
6. What instructional materials can be developed in environmental education based on the result of the study?

2. LITERATURE REVIEW

This section presents topics and literature related to the present concept under study; this was with the hope of giving the readers a clear view of the concept of the problems and ecological challenges in today's society, given the pressing threats of climate change, biodiversity loss, and environmental degradation. With senior high schools playing a pivotal role in shaping the attitudes and knowledge of youth towards environmental issues. The findings of the different research similar to this study were presented to provide us a better understanding and a clear view on what was being emphasized in this study. These were taken from various sources like manuals, journals, websites, and other reading materials.

Environmental Education

"Environmental education (EE) organizations and institutions have adopted a set of essential elements as their definition of EE, which were produced by participants to the United Nations Intergovernmental Conference on Environmental Education in 1977 in Tbilisi, Georgia, in the former USSR. According to the North American Association for Environmental Education, a single goal statement for EE that was written in Belgrade, Yugoslavia in 1975 has been adopted as a commonly used goal statement" (NAAEE, 2016). "Environmental education is the process of creating a global population that is conscious of the environment as a whole and the issues that arise from it, and that has the knowledge, abilities, attitudes, motivations, and commitment to work both individually and collectively toward solving existing issues and preventing the emergence of new ones" (Athman and Monroe, 2000). "In order to achieve the overarching goal of a homeostasis between quality of life and quality of the environment, Gary Harvey (2016)'s work, which synthesized a definition from numerous professional papers, defined the term EE as: The process of developing an environmentally literate, competent, and dedicated citizenry that actively strives to resolve values conflicts in the man-environment relationship, in a manner that is ecologically and humanistically sound" (Gough, 2017). The final objective for curriculum development in EE puts forth by Hungerford, Peyton, and Wilke (2000) in the seminal book Goals for curriculum development in environmental education served as the foundation for the declaration in Tbilisi.

"Environmental Education (EE) has been defined more briefly as a procedure that empowers citizens to prevent and address environmental issues" (Day & Monroe, 2000). "The Tbilisi Declaration claimed that EE should promote initiative, a sense of responsibility, and a commitment to creating a better tomorrow. It also stated that EE should involve the individual in an active problem-solving process within the framework of particular circumstances" (Hungerford & Peyton, 1994). "Consequently, by its very nature, EE may significantly contribute to the reform of the educational system" (Courtenay-Hall & Rogers, 2002).

Models and Constructs of Environmental Education

A world where the socially constructed nature of knowledge is acknowledged has been made possible by approaches to education, societal attitudes toward the environment, and community attitudes toward society. In this universe, teachers and students collaborate to create effective EE programs that lead to socially conscious curricula Gough (2017).

For the creation of successful EE programs, certain curriculum models have been suggested. Concerning worry, Stern and Dietz (2014) suggested a tripartite taxonomy of ecological value orientations: care for self, concern for other humans, and concern for the ecosystem, as discussed in Zelezny, Chua, and Aldrich (2000). Similar conceptions—the egocentric, the guardianship, and the ecocentric conception—were developed by Ballantyne and Packer (2006).

A curriculum created by Hungerford and Peyton (2004) includes the Tbilisi objectives into four stages that change as the kids get older. Ecological principles are introduced in Level I, giving students knowledge that will enable them to make environmentally responsible decisions. Information (consciousness) about various facets of human environmental behavior is the main subject of Level II. The skills required for investigation, appraisal, and value clarification are the main topics of Level III. The processes that are crucial to citizenship action are the emphasis of Level IV.

In the literature, there have been at least three primary ideologies of environmental education (Palmer, 2008). According to the positivist ideology, the goal of EE is to spread environmental knowledge. It sees the learner as only the recipient of information. The job of the educator is that of the knowledge authority. The interprevist perspective emphasizes on actions taking place in the environment, where teachers plan the experiences and students actively learn from them. The critical philosophy of EE sees action for the environment as its ultimate goal. While teachers operate as collaborative participants and inquirers, learners actively create new information.

The link between education about the environment, for the environment, and in/from the environment is reflected in Palmer's (2008) integrated model of EE. The learning procedures and curricular components that are based on concepts, abilities, and attitudes are at the heart of this paradigm. Concern, experience, and action must interact throughout curriculum model planning. Palmer claims that this approach calls for suitable assignments that give students "experiences in problem-solving, decision-making and participation in decisions impacting the environment with considerations based on ecological, political, economic, social, cultural, and ethical dimensions."

Environmental Education in the Global Perspective

"Given its topography, population, and worldwide economic status, there is strong evidence that the Philippines is plagued by different environmental challenges and risks. The Philippines is an archipelagic country in Southeast Asia with over 7,000 islands and a total land and water size of almost 300,000 square kilometers" (ADB, 2009).

Grant (2012) highlighted "the nine principles of environmental education, which give ideas to the educational system's environmental awareness implications. 1) Education should emphasize our interdependence with other people, other animals, and the earth as a whole, according to the nine principles. 2) Education should aid pupils in their transition from awareness to knowledge to action. Teachers, students, and schools in the world's wealthier countries should reduce their resource usage. 3) Students must have opportunities to strengthen their own connection to nature. 4) Education should focus on the future. 5) To reconnect with the planet, we must relearn "ancient wisdoms" from indigenous peoples. 6) Every subject in school should incorporate media literacy. 7) Facilitators should be teachers. 8) Teachers should provide a good example for their students by "walking their talk." 9) In terms of environmental practices, an environmental evaluation is a crucial instrument for monitoring performance, reviewing progress, and setting goals".

Meanwhile, on the topic of environmental protection, Licy et al. (2013) stated that "while this issue has gained global prominence in this era, simple ideas such as waste disposal are frequently overlooked. Even if people all around the world are aware of the consequences of poor trash disposal techniques, the negative attitude toward their execution contributes to chaos".

Grimmette (2014), for example, "recognized the effects of environmental problems on youth and proposed endorsements to educate the youth with the concept of environmental education programs such as environmental awareness, building an association with the environment, and shifting youth's views and opinions on the environment. The study found a significant favorable effect in three programs related with camp curriculum: human influence on the water cycle, animal importance to people, and allocating time to solve problems in nature".

Sindhu and Singh (2014) conducted "an implication study in which educational stakeholders such as teachers, educational planners, parent educators, and educational administrators were given educational proposals. Environment teachers, students, parents, and the community were encouraged to participate in special awareness programs like as seminars, symposiums, camps, and community visits. It was emphasized that the formal educational system should provide environmental awareness to teenagers and young children in order to promote the preliminary environmental education course in teacher education programs and other courses for instructors. Environmental education (EE) was found to serve a significant influence in reducing and avoiding current and future environmental disparities in the

study. Environmental education can be carried out at any of the four phases of formal education: elementary, lower secondary, high secondary, and college education".

"Environmental education can have a significant impact on students' understanding, actions, and attitudes toward environmental conservation if it is integrated into the curriculum at all levels of education. With effective environmental instruction, pupils would be able to differentiate signals on how to practice environmental sustainability and conservation" (Roto, 2014).

"Environmental educators should emphasize the affective and psychomotor domains of education", according to Sharma (2004). Teachers are only interested with the fact that a student recognizes and understands an assignment and can complete it satisfactorily; nevertheless, this does not suggest that the student is attentive to the activity and confident in their ability to repeat it, which is a cognitive domain. Learners' emotions, on the other hand, should be aroused to be interested, optimistic, and motivated to act. As a result, simply presenting facts is insufficient.

Sharma (2004) examined "a number of environmental education techniques evolving to meet the requirements of a growing urban population in their paper Urban Environmental Education from a Social-Ecological Perspective: Conceptual Framework for Civic Ecology Education. A conceptual framework based on social-ecological systems and social learning theory was presented to generate research issues in urban environmental education. Educational programs, stewardship practice, and other social-ecological system components and processes were offered, as well as methods in which urban environmental education could contribute to community well-being and local ecosystem services".

Environmental Education in the Philippines

"In an effort to address the myriad environmental concerns, the Philippine government has devoted itself to environmental protection and natural resource management through a comprehensive legal and regulatory structure. The Philippine Environmental Policy and the Philippine Environment Code (Presidential Decree No. 1151, 1152, s. 1977), the Philippine Strategy for Sustainable Development of 1989, Executive Order No. 15 in 1992, which established the Philippine Council for Sustainable Development (PCSD), and the National Action Plan for Sustainable Development of 1996 all require environmental and natural resource management. Devolution and the application of ENR legislation and regulations are further covered by the Local Government Code of 1991. The Ecological Solid Waste Management Act of 2000, the Wildlife Resources Conservation and Protection Act of 2001, the Public Land Act of 2002, the Philippine Clean Water Act of 2004, and the Biofuels Act of 2006 are among the major ENR laws signed in the last seven years. The Department of Environment and Natural Resources' (DENR) priorities are aligned with significant government planning frameworks such as the country's Medium-Term Philippine Development Plan and the Millennium Development Goals" (ADB, 2009).

"In the Philippines, environmental education is taught as part of other courses such as life and physical sciences, social studies, geography, civics, and moral education, rather than as a separate subject, as it is in other Southeast Asian countries. The National Strategy on Environmental Education (NSEE), which was launched in 1989, aims to create a responsible and environmentally literate citizenry that will ensure the country's environmental protection and progress, as well as endorse and implement sustainability, social equity, and economic efficiency in the use of natural resources" (Kong et al., 2000). "The obligations for sustainable development in education were reinforced with the release of the National Environmental Education Action Plan for Sustainable Development for the years 2005 to 2014, which was specifically organized to coincide with the UN Decade of Education for Sustainable Development" (Didham& Ofei-Manu, 2012).

Hinojosa (1996) stressed "the Department of Environment and Natural Resources – Environment Management Bureau's comprehensive list of environmental education unifying themes (DENR-EMB). These issues, as stated by the environmental protection agency, were the foundation of research difficulties handled by many experts in the field. The following themes appear on the list: 1) Interdependence - Everything is interconnected; 2) Change - Everything changes. 3) Diversity and stability - While some changes improve the natural status of the environment, others destroy it; It supports

stability; 4) Resources are finite - The majority of the world's resources are finite. As a result, they must be utilized intelligently; 5) Materials cycle - Everything must go somewhere and end somewhere; 6) Natural balance - Nature has its own rules and processes to sustain it; and 7) Stewardship - Humans are a part of nature. They are stewards of the earth, not masters".

"The Environmental Education Network of the Philippines, Inc. (EENP) and the Philippine Association of Tertiary Level Educational Institutions in Environmental Protection and Management (PATLEPAM) are two national environmental education networks that complement state-led efforts to integrate sustainable development into school programs, campus management, and organizational philosophy. Significant advancements in environmental education for sustainable development (EESD) include the creation of undergraduate and graduate degree programs with an environmental focus now offered by academic institutions, as well as training programs offered by both government agencies and individual institutions" (Galang, 2010).

In his book "Philippine Environmental Laws: An Overview and Assessment," Cosico (2012) emphasized that "the Philippines must have an urgent requirement to regulate human activities in addition to raising Filipino awareness because it is located in the Pacific typhoon belt and is more vulnerable to natural calamities and catastrophes. The Philippine Environmental Laws were examined, which should be included in environmental education programs because they address a wide range of environmental issues such as deforestation, biodiversity loss, and pollutant kinds. These statements provide students with options for how to learn about Philippine environmental policies by participating in activities aimed at promoting awareness of these essential laws".

Environmental Awareness and Practice of Filipino Students

Several studies on this topic were presented by educational scholars, with the goal of resolving environmental problems and phenomena. Within this decade of Education for Sustainable Development, according to Esa (2010), educational institutions must improve their efforts to educate their students for a sustainable future (ESD). In order to effectively integrate ESD into teaching after graduation, aspiring teachers must exhibit pro-environmental behavior and attitudes. To guarantee effective delivery, it is recommended that you have a good understanding of the surroundings. The study gathered and assessed the environmental knowledge, attitudes, and practices of pre-service secondary teachers enrolled in an undergraduate Biology Teaching Methods course. The study's findings revealed that a more concerted effort in teacher preparation is required to prepare them for their role in environmental education.

Similarly, Pardo (2012) noted that "environmental damage has a corrupting effect and that its future prospects are enormous. It's a good sign that the kids who will be responsible for environmental stewardship in the future may pass on their knowledge to future generations as part of sustainability".

"According to a survey conducted at one of the Philippines' institutions, the participants had a high level of environmental knowledge and good behaviors on broad environmental subjects. Cutting trees, forest fires, quarrying, poaching, road widening, squatting, mining, river drilling, inorganic fertilizer use, and industrialization were all activities that the students disliked. To improve students' environmental awareness, behaviors, and attitudes, the University should design an environmental education program and ensure that environmental laws and ordinances are implemented consistently" (Sharma, 2004).

Reyes (2014) used "data from the environment modules of the International Social Survey Program in 1993, 2000, and 2010 to examine the attitudinal aspects, trends, and major predictors of public and private conduct in the Philippines over the last two decades. Perceptions of specific environmental concerns and fatalism are consistently strong indicators of unfavorable sentiments. Over the last two decades, no major increases in environmental behaviors among Filipinos have been discovered. It was also stressed that educational attainment is a crucial indicator for environmental actions such as driving less, signing petitions, donating money, joining groups, and participating in public protests".

The effects of climate change, global warming, ozone depletion, pollution, species extinction, desertification, and improper waste management are now being experienced by the inhabitants of the mother earth, according to a study titled "Environmental Awareness and Practices among High School Students: Basis for Disaster Preparedness Program" by Marpa and Juele (2016). As one of the countries affected by this problem, the Philippines is not immune to these dangers. To address this issue, a study of environmental knowledge and practice among high school students was conducted. The survey found that respondents had a high level of environmental knowledge and practices, but only a modest level of environmental greening. Because the two variables had a substantial association, the necessity for advocacy and integration of environmental education with a focus on green technology was justified.

Gonzaga (2016) looked at “Students' Green Technology Awareness and Practices, focusing on the participants' level of awareness and breadth of green technology practices. The participants in this study were Bachelor of Education students from Philippine Normal University Visayas, and the elements that were associated to the study's key variables were sex, community, academic status, secondary school, and family income. The participants in this study had a reasonable level of awareness of green technology but a limited number of green technology practices. The level of awareness and the extent of practices acquired from the replies likewise had a favorable link. This article proposes the creation of a comprehensive program in college education that incorporates the concepts and applications of green technology in order to engage students' active engagement in the promotion of environmental sustainability”.

3. METHODOLOGY

3.1 Research Design

The study used a descriptive-correlational design that describes the variables and the relationships that occur naturally between and among them. Moreover, survey questionnaire for the collection of data was used and prior to the conduct of the survey, a permit was secured in the office of the Principal and participants signed a free prior consent form. The survey was taken using random sampling.

3.2 Research Locale

The location of the study was conducted in Montevista Stand Alone Senior High School, Montevista Davao de Oro, Davao Region, Philippines. This selected school belongs to the large high school’s in Davao de Oro and the largest in Montevista District.

3.3 Research Respondents

A total of one hundred fifty (150) respondents participated in the study with 25 teachers and 125 senior high school students in Montevista Stand Alone Senor High School, Montevista Davao de Oro, Davao Region, Philippines.

3.4 Sampling Technique

A random sample design technique was utilized to pick the respondents. A simple random sample is a subset of a population chosen at random. Each member of the population has an exact equal probability of being chosen in this sampling approach. Because it only takes a single random selection and little prior knowledge about the population, this method is the simplest of all the probability sampling methods. Any research conducted on this sample should have excellent internal and external validity due to the randomization. In this study, the participants are Senior High School Grade 11 and Grade 12 students.

3.5 Research Instrument

The instruments used in the study were the survey questionnaires adapted from the study of (Rogayan and Nebrida) 2019 to determine the awareness and practices of teachers and students on Environmental Education. The questions were designed with simplicity for the comfort of the participants via google form. Senior high school teachers and students were approached at the beginning of the 1st quarter of Academic year 2022-2023 using random sampling. The research instrument was administered via google and this was done to avoid and minimize contacts and to follow the DOH and IATF guidelines. All data were retrieved and analyzed. Privacy and confidentiality of the answers were maintained throughout the study.

3.6 Data Analysis

To determine the level of awareness and practices among senior high students and teachers, each of the questionnaire was manually checked for the correct answers and recorded. The mean was computed for awareness and practices for both senior high school students and teachers. In order to compare if there would be significance of the mean among senior high school students and teachers when grouped according to their demographic profile, t-test and Analysis of Variance (ANOVA) were used. Mann-Whitney test and Pearson Correlation analysis were used to associate awareness and practices. All statistics are significant if $p<0.05$. All statistical analyses were done using SPSS version 20 at the Mathematical and Statistical Computing and Research Center at Caraga State University, Ampayon, Butuan City.

4. RESULTS AND DISCUSSION

This section deals with the presentation, analysis, and interpretation of the data gathered from the respondents. The order of the discussion follows the sequence of the statement of the problem.

Problem 1. What is the demographic profile of the respondents?

There were two aspects of profiles measured in the study; the (1) personal profile of the respondents measuring the age and gender; (2) and the academic profile which focused in the year level, strand, and grade level taught. Table 1 presents the demographic profile of the respondents. As shown, majority (44%) of the teacher- respondents were 41-50 years old, which was followed by 31-40 years old respondents consisting 32% and there were 24% who were 20-30 years old. It was also shown that majority (51.20%) of the student- respondents were 17-18 years old, which was followed by 15-16 years old respondents consisting 48.80%. In terms of gender of teachers, 60% were females while 40% were males. While 52.80% were females and 47.20% were males for students. 56% of the teachers were teaching in Grade 12, while 44% were teaching in Grade 11. Moreover, 50.40% of the students were Grade 12 while 49.60% were Grade 11. For the students' strand, 59.20% were Non-STEM while 40.80% belong to STEM Strand.

Table 1. Demographic profile of the respondents.

Group		Subgroup	Frequency	Percentage (%)
Teacher (n=25)	Gender	Female	15	60
		Male	10	40
	Grade taught	Grade 11	11	44
		Grade 12	14	56
	Age	20-30 yrs.old	6	24
		31-40 yrs.old	8	32
		41-50 yrs.old	11	44
Student (n=125)	Gender	Female	66	52.80
		Male	59	47.20
	Grade level	Grade 11	62	49.60
		Grade 12	63	50.40

Age	15-16 yrs.old	61	48.80
	17-18 yrs.old	64	51.20
Strand	STEM	51	40.80
	Non-STEM	74	59.20

The profile of the respondents of this study affirmed the findings of Oebanda (2009) that, majority of the teachers teaching environmental education subjects are in middle age while senior high school learners are in adolescent years. It reflects a certain extent the results of the US National Survey by McIntosh et al. (2001) that most institutions of secondary education had a greater number of females compared to males both in teachers and students.

Problem 2. What is the level of awareness of the students and teachers on Environmental Education?

2.1 Awareness of Environmental Concepts and the State of Environment

The teacher-respondents were "Very Aware" in environmental concepts and state of the environment as revealed by the overall mean of 4.34 while the student-respondents were "Moderately Aware" as revealed by the overall mean of 3.18 (Table 2). For the teachers, the top items include the following: global warming is brought about by rising levels of heat-trapping gases, known as greenhouse gases, in the atmosphere (M=5.00); the ozone layer of the atmosphere protects life on Earth by absorbing harmful ultraviolet radiation from the Sun (M=5.00); and acid rain is a form of air pollution in which airborne acids produced by electric utility plants and other sources fall to Earth in distant regions (M=5.00). Moreover, the students top items include the following: global warming is brought about by rising levels of heat-trapping gases, known as greenhouse gases, in the atmosphere (M=3.70); the ozone layer of the atmosphere protects life on Earth by absorbing harmful ultraviolet radiation from the Sun (M=3.65); and rainforests are the world's most biologically diverse ecosystems (M=3.42).

"This implies that the teacher- respondents were highly aware in the role of ozone layer in the protection of life, the causes of global warming, and how acid rains were formed. Further, this also means that the student- respondents were moderately aware in the role of ozone layer in the protection of life, the causes of global warming, and the importance of rainforests in the balance of life". [48]

Meanwhile, the respondents were "Slightly Aware" on Agenda 21 as a plan of the United Nations in which large developing countries promised to develop their industries with an eye toward protecting the environment (M=2.20) and (M=2.34).

These results indicate that teachers have higher knowledge than the students. This supports to the study of Walshaw (2012), "that teachers' conceptual understanding and knowledge is critically important at any level. They develop the flexibility for spotting opportunities that they can use for moving students' understandings forward. When teachers use their knowledge to enhance student learning, they are engaging in effective practice. Teachers have higher knowledge because they earn a degree, having their professional license, attended different training and workshops, enrolled in graduate studies in order to enhance their intelligence making them more knowledgeable and fully equip in their own field of specialization".

Table 2. Level of awareness of the respondents on Environmental Education in terms of environmental concepts and the state of environment.

Statement	Teacher Response		Student Response	
	Mean	Verbal Description	Mean	Verbal Description
1. Agenda 21 is a plan of the United Nations in which large developing countries promised to develop their industries with an eye toward protecting the environment.	2.20	Slightly Aware	2.34	Slightly Aware

2. Rainforests are the world's most biologically diverse ecosystems.	4.64	Highly Aware	3.42	Moderately Aware
3. Global warming is brought about by rising levels of heat-trapping gases, known as greenhouse gases, in the atmosphere.	5.00	Highly Aware	3.70	Very Aware
4. The ozone layer of the atmosphere protects life on Earth by absorbing harmful ultraviolet radiation from the Sun.	5.00	Highly Aware	3.65	Very Aware
5.Sustainable development means increasing standards of living without destroying the environment.	4.36	Very Aware	2.94	Moderately Aware
6. Desertification is the decline in the biological or economic productivity of the soil in dry and semi-dry areas resulting from various factors including human activities.	3.72	Very Aware	2.80	Moderately Aware
7. Acid rain is a form of air pollution in which airborne acids produced by electric utility plants and other sources fall to Earth in distant regions.	5.00	Highly Aware	3.04	Moderately Aware
8. Indigenous peoples are those who have inhabited and made their living directly off the same environment for hundreds or thousands of years.	4.80	Highly Aware	3.41	Moderately Aware
9. There is only one percent of all the water in the world that is available for drinking.	4.36	Very Aware	3.30	Moderately Aware
10. According to the Philippine Constitution, it is the state's primary duty to protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature.	4.28	Very Aware	3.25	Moderately Aware
Average	**4.34**	**Very Aware**	**3.18**	**Moderately Aware**

Mean: 1.00-1.49- Totally Unaware, 1.50-2.49, Slightly Aware, 2.50-3.49- Moderately Aware,3.50-4.49- Very Aware, 4.50-5.00- Highly Aware

The findings are consistent with the study of Singh (2015) which concluded that "the undergraduate students possessed a good average level of environmental awareness". Further, the result of this study affirmed the findings of Oebanda (2009) that, "students had an average level of knowledge". "It reflects a certain extent the results of the US National Survey" by McIntosh et al. (2001) that most institutions of higher education had done nothing to provide environmental knowledge systematically. And that unless they are majoring in environmental studies, students in many institutions may complete their studies without gaining basic environmental literacy.

2.2 Awareness of Environmental Issues and Problems

The teacher-respondents were "Very Aware" in environmental issues and problems with an overall mean of 3.89 while the student-respondents were "Moderately Aware" with an overall mean of 2.92 (Table 3). In particular, the indicators with highest means for the teachers include the following: The environment is confronted with a myriad of environmental issues and problems at present (M=5.00); climate change is very evident in every part of the globe like the extreme heat experienced by Australia and excessive coldness in Canada (M=5.00); and The Central Visayas is severely battered by Typhoon Yolanda which is considered as one of the world's strongest typhoon in history (M=4.88). On the other hand, the indicator with highest mean for the students include: The Central Visayas is severely battered by Typhoon Yolanda which is considered as one of the world's strongest typhoon in history (M=3.69).

"The findings of the study are consistent with the results of the previous studies that the environmental awareness of the students is high" (Anilan, 2014; Milos & Cicek, 2014; Singh, 2015; Garcia &Luansing, 2016; Sharma, 2016; Puri & Joshi, 2017).

Table 3. Level of awareness of the respondents on Environmental Education in terms of environmental issues and problems.

Statement	Teacher Response		Student Response	
	Mean	**Verbal Description**	**Mean**	**Verbal Description**
1. The environment is confronted with a myriad of environmental issues and problems at present.	5.00	Highly Aware	2.55	Moderately Aware
2. There is an attempt to establish a coal-fired power plant in Subic Bay which can affect can pose threats to the environment and the health of the people.	3.56	Very Aware	2.82	Moderately Aware
3. The Central Visayas is severely battered by Typhoon Yolanda which is considered as one of the world's strongest typhoon in history	4.88	Highly Aware	3.69	Very Aware
4.Bohol is greatly affected by a strong earthquake which caused colossal destructions in the province's old-age churches and other structures.	4.56	Highly Aware	3.22	Moderately Aware
5. Ormoc City experienced one of the severest landslides in history which killed thousands of people.	3.24	Moderately Aware	2.95	Moderately Aware
6. A total of 700 people were killed and hundreds were injured in Aurora landslide in 2004	2.16	Slightly Aware	2.46	Slightly Aware
7. Major mine spill took place in 2005 which contaminated several bodies of water and caused fish kill in Albay Gulf.	3.40	Moderately Aware	2.65	Moderately Aware
8. Rice crisis happened in 2008 and continued landlessness and backward agriculture occurred.	2.80	Moderately Aware	2.79	Moderately Aware
9. Palawan clamored to the people in a signature campaign to never allow mining in the province which is considered as the country's last ecological frontier.	4.28	Very Aware	2.75	Moderately Aware
10. Climate change is very evident in every part of the globe like the extreme heat experienced by Australia and excessive coldness in Canada	5.00	Highly Aware	3.29	Moderately Aware
Average	**3.89**	**Very Aware**	**2.92**	**Moderately Aware**

Mean: 1.00-1.49- Totally Unaware, 1.50-2.49, Slightly Aware, 2.50-3.49- Moderately Aware,3.50-4.49- Very Aware, 4.50-5.00- Highly Aware

The results of the study, however oppose the findings of Sahu, Roy, Monika & Rajkiran (2015) which found out that "the overall level of awareness was found to be average. Number of students with

high level of awareness is found to be extremely low whereas number of students with low level of awareness is found to be fairly high. Meanwhile, the respondents show “Slightly Aware” on a total of 700 people were killed and hundreds were injured in Aurora landslide in 2004 (M=2.16) and (M=2.46)”.

The study refutes the findings of Bhat et al. (2016) which indicated that “the students due to problems of population explosion, exhaustion of natural resources and pollution of environment are not having enough awareness and skills for identifying and solving environmental problems”.

Problem 3. What is the extent of environmental practices of the students and teachers on Environmental Education?

3.1 Needs to Take Actions to Solve Environmental Problems

The teacher- respondents “Always” practice the need to take actions to solve environmental problems as revealed by the overall mean of 4.52 while the student-respondents “Often” practice the need to take actions to solve environmental problems as unveiled by overall mean of 3.80 (Table 4). Top items for teachers include: turn off the lights and unplug appliances when not in use to save electricity (M=5.00); avoid throwing garbage anywhere and learn the science of segregation of solid wastes (M=5.00); and recycle and reuse non-biodegradable materials to lessen solid wastes (M=5.00).

Moreover, top items for sudents include: turn off the lights and unplug appliances when not in use to save electricity (M=4.26); use reusable water bottles or tumblers instead of buying bottled water in the canteen or stores. (M=4.24); and recycle and reuse non-biodegradable materials to lessen solid wastes (M=4.22).

Table 4. Extent of environmental practices of the respondents on Environmental Education in terms of needs to take actions to solve environmental problems.

Statement	Teacher Response		Student Response	
	Mean	Verbal Description	Mean	Verbal Description
1. Turn off the lights and unplug appliances when not in use to save electricity.	5.00	Always	4.26	Often
2. Harness solar energy, a radiation produced by nuclear fusion reactions deep in the Sun’s core.	2.40	Seldom	3.26	Sometime
3. Plant endemic trees in the vacant areas in the community to prevent soil erosion and get more oxygen to breathe.	4.08	Often	3.59	Often
4. Avoid the use of plastic and Styrofoam which cause harm not only to the environment but also to human health.	4.16	Often	3.77	Often
5. Avoid throwing garbage anywhere and learn the science of segregation of solid wastes.	5.00	Always	3.92	Often
6. Keep a good food ethics and avoid eating with left-overs and wasting drinking	5.00	Always	3.90	Often
7. Lessen the use of detergents for they tend to create foam in gutters and in sewage-disposal plants and even appeared in naturally occurring ground and surface waters.	4.64	Always	3.34	Sometime
8. Practice the science of composting which produces partially decomposed organic material used in gardening to improve soil and enhance plant growth.	5.00	Always	3.48	Sometime
9. Recycle and reuse non-biodegradable materials to lessen solid wastes.	5.00	Always	4.22	Often

10. Use reusable water bottles or tumblers instead of buying bottled water in the canteen or stores.	4.88	Always	4.24	Often
Average	**4.52**	**Always**	**3.80**	**Often**

Mean: 1.00-1.49- Never, 1.50-2.49 Seldom, 2.50-3.49- Sometime,3.50-4.49- Often, 4.50-5.00- Always

Meanwhile, the respondents "Sometimes" practice the following: "Practice the science of composting which produces partially decomposed organic material used in gardening to improve soil and enhance plant growth (M=3.48); lessen the use of detergents for they tend to create foam in gutters and in sewage-disposal plants and even appeared in naturally occurring ground and surface waters (M=3.34); .and Harness solar energy, a radiation produced by nuclear fusion reactions deep in the Sun's core (M=3.26)".[48] The study corroborates the findings of Sivamoorthy, Nalini & Kumar (2013) that "the level of awareness is high but the practice level is moderate among high school students".

3.2 Needs to possess a High Degree of Commitment

The teacher- respondents "Often" practice the need to possess a high degree of commitment as revealed by the overall mean of 4.13 while the student-respondents "Sometimes" practice the need to possess a high degree of commitment as unveiled by overall mean of 3.29 (Table 5). Top items for teachers include: discuss with friends and relatives about environmental issues and concerns that confront the community and the country as a whole. (M=5.00); Encourage everyone to be ambassadors of the environment in their respective communities specifically your fellow youth (M=4.92); and support initiatives and programs on environmental conservation like the National Greening Program of the present administration (M=4.88).

Moreover, top items for students include: discuss with friends and relatives about environmental issues and concerns that confront the community and the country as a whole. (M=4.26); and support initiatives and programs on environmental conservation like the National Greening Program of the present administration (M=3.51).

The results support the claim of Puri & Joshi (2017) that "the green attitude of the students is clearly visible in their action which is step towards Education for Sustainable Development (ESD)". "Likewise, the findings of the study are consistent with the results of the previous studies that the environmental practices of the students are high" (Puri & Joshi, 2017).

Table 5. Extent of environmental practices of the respondents on Environmental Education in terms of needs to possess a high degree of commitment.

Statement	Teacher Response		Student Response	
	Mean	Verbal Description	Mean	Verbal Description
1. Discuss with friends and relatives about environmental issues and concerns that confront the community and the country as a whole.	5.00	Always	3.74	Often
2. Lobby for relevant laws on environmental conservation with the support of your political leaders especially the congressmen.	4.08	Often	3.25	Sometime
3. Write articles in the newspaper which encourage people to take part in responding to the different environmental problems.	2.40	Seldom	2.97	Sometime
4. Organize an environmental forum or symposium with your fellow youth and the community people.	4.04	Often	3.26	Sometime
5. Write an appeal to your political leaders regarding environmental concerns of your community.	3.60	Often	3.16	Sometime
6. Ask the support of the media in exposing anomalies and irregularities which led to the	3.36	Sometime	3.03	Sometime

destruction of the environment.

7. Deliver a talk or discourse about environmental literacy to heighten the awareness of the people	4.40	Often	3.47	Sometime
8. Volunteer to organizational groups which help for the preservation and conservation of the environment.	4.60	Always	3.34	Sometime
9. Encourage everyone to be ambassadors of the environment in their respective communities specifically your fellow youth	4.92	Always	3.18	Sometime
10. Support initiatives and programs on environmental conservation like the National Greening Program of the present administration	4.88	Always	3.51	Often
Average	4.13	Often	3.29	Sometime

Mean: 1.00-1.49- Never, 1.50-2.49 Seldom, 2.50-3.49- Sometime,3.50-4.49- Often, 4.50-5.00- Always

Problem 4. Are there significant differences in the level of awareness and extent of environmental practices on environmental education among teachers and senior high school students when grouped according to their demographic profile?

4.1 Significant difference in the level of environmental awareness and extent practices of the teachers when grouped according to their demographic profile.

There was no statistically significant difference in the level of awareness of environmental concepts and the state of environment when grouped according to their gender with p-value of 0.207 and grade level taught with p-value of 0. 910.However, there was a statistically significant difference for age with p-value of 0.000 when comparing all the teacher- participants. Moreover, there were no statistically significant differences in terms of awareness of environmental issues and problems and practices of the need to take actions to solve environmental problems of the teachers when grouped according to their demographic profile. On the other hand, it was revealed that there was no statistically significant difference in the level of practices of the need to possess a high degree of commitment when grouped according to their gender with p-value of 0.433 and grade level taught with p-value of 0.845. However, there was a statistically significant difference for age with p-value of 0.000 when comparing all the teacher- participants.

Moreover, the results implied that whatever sexes students may have, their environmental knowledge would not be affected which was contrary to Roto's (2014) findings that there was a significant difference in students and teachers' level of environmental knowledge when respondents were grouped according to their sexes.

Table 6. Significant difference in the level of environmental awareness and extent practices of the teachers when grouped according to their demographic profile.

Variable	Group	Subgroup	Mean	SD	p-value	Remark
Awareness of Environmental Concepts and the State of Environment	Gender*	Female	4.27	0.30	0.207	Not significant
		Male	4.44	0.36		
	Grade taught*	Grade 11	4.33	0.34	0.910	Not significant
		Grade 12	4.34	0.33		
	Age**	20-30 yrs.old	4.70	0.16	0.000	significant
		31-40 yrs.old	4.63	0.11		
		41-50 yrs.old	4.05	0.242		

Awareness of Environmental Issues and Problems	Gender*	Female	3.88	0.41	0.886	Not significant
		Male	3.90	0.18		
	Grade taught*	Grade 11	3.91	0.36	0.696	Not significant
		Grade 12	3.86	0.32		
	Age**	20-30 yrs.old	4.00	0.36	0.597	Not significant
		31-40 yrs.old	3.81	0.45		
		41-50 yrs.old	3.89	0.21		
Practices of the Need to Take Actions to Solve Environmental Problems	Gender*	Female	4.53	0.17	0.721	Not significant
		Male	4.50	0.20		
	Grade taught*	Grade 11	4.46	0.19	0.127	Not significant
		Grade 12	4.56	0.16		
	Age**	20-30 yrs.old	4.56	0.22	0.200	Not significant
		31-40 yrs.old	4.59	0.19		
		41-50 yrs.old	4.45	0.13		
Practices of the Need to Possess a High Degree of Commitment	Gender*	Female	4.07	0.32	0.433	Not significant
		Male	4.21	0.54		
	Grade taught*	Grade 11	4.11	0.34	0.845	Not significant
		Grade 12	4.14	0.48		
	Age**	20-30 yrs.old	4.37	0.35	0.000	significant
		31-40 yrs.old	4.40	0.25		
		41-50 yrs.old	3.80	0.31		

**tested at 0.05 level of significance using independent sample t-test, **tested at 0.05 level of significance using Kruskal-Wallis test*

The result for the significant difference between students' environmental knowledge when grouped according to strand was strongly supported by Oebanda (2009) on her study that there was a significant difference in students' environmental knowledge when they were grouped according to their degree programs.

4.2 Significant difference in the level of environmental awareness and extent practices of the students' when grouped according to their demographic profile.

There was no statistically significant difference in the level of awareness of environmental concepts and the state of environment when grouped according to their grade level with p-value of 0.162 and age with p-value of 0. 213.However, there was a statistically significant difference for gender with p-value of 0.000 and strand with p-value of 0.000 when comparing all the student- participants.

Moreover, there were no statistically significant differences in terms of awareness of environmental issues and problems when grouped according to their grade level with p-value of 0.237 and age with p-value of 0. 344. However, there was a statistically significant difference for gender with p-value of 0.000 and strand with p-value of 0.000 when comparing all the student- participants.

Further, there were no statistically significant differences in terms of practices of the need to take actions to solve environmental problems of the students when grouped according to their grade level with p-value of 0.622 and age with p-value of 0. 744. However, there was a statistically significant difference

for gender with p-value of 0.000 and strand with p-value of 0.000 when comparing all the student-participants.

Table 7 presents the result on the significant difference in the level of environmental awareness and extent practices of the students when grouped according to their demographic profile.

Table 7. Significant difference in the level of environmental awareness and extent practices of the students' when grouped according to their demographic profile.

Variable	Group	Subgroup	Mean	SD	p-value*	Remark
Awareness of Environmental Concepts and the State of Environment	Gender	Female	2.56	1.21	0.000	Significant
		Male	3.74	0.74		
	Grade level	Grade 11	3.11	1.02	0.162	Not significant
		Grade 12	3.26	1.27		
	Age	15-16 yrs.old	3.13	1.01	0.213	Not significant
		17-18 yrs.old	3.24	1.27		
	Strand	STEM	4.16	0.38	0.000	Significant
		Non-STEM	2.52	1.02		
Awareness of Environmental Issues and Problems	Gender	Female	2.38	1.34	0.000	Significant
		Male	3.40	0.98		
	Grade level	Grade 11	2.78	1.26	0.237	Not significant
		Grade 12	3.05	1.26		
	Age	15-16 yrs.old	2.81	1.25	0.344	Not significant
		17-18 yrs.old	3.02	1.28		
	Strand	STEM	4.20	0.54	0.000	Significant
		Non-STEM	2.03	0.74		
Practices of the Need to Take Actions to Solve Environmental Problems	Gender	Female	3.33	1.08	0.000	Significant
		Male	4.22	0.64		
	Grade level	Grade 11	3.78	0.84	0.622	Not significant
		Grade 12	3.81	1.11		
	Age	15-16 yrs.old	3.80	0.84	0.744	Not significant
		17-18 yrs.old	3.80	1.11		
	Strand	STEM	4.68	0.26	0.000	Significant
		Non-STEM	3.20	0.82		
Practices of the Need to Possess a High Degree of Commitment	Gender	Female	2.82	1.05	0.000	Significant
		Male	3.71	0.81		
	Grade level	Grade 11	3.02	0.79	0.001	Significant
		Grade 12	3.55	1.17		
	Age	15-16 yrs.old	3.04	0.78	0.002	Significant
		17-18	3.53	1.18		

		yrs.old				
	Strand	STEM	4.32	0.35	0.000	Significant
		Non-STEM	2.58	0.68		

**tested at 0.05 level of significance using Mann-Whitney test*

On the other hand, it was revealed that there was statistically significant difference in the level of practices of the need to possess a high degree of commitment when grouped according to their demographic profile (p<.05) when comparing all the student- participants.

Problem 5. Is there a significant correlation between the level of environmental awareness and extent practices of the respondents?

For the teachers, there was no significant positive moderate correlation between awareness of environmental concepts and the state of environment to the needs to take actions to solve environmental problems (r=0.245; p=0.238) which implies that as the awareness of environmental concepts increase, the actions to solve environmental problems are not affected.

"The awareness of environmental concepts was significantly positively related to needs to possess a high degree of commitment as revealed by the r-value of 0.455. (p=0.022). This suggests that as the awareness of environmental concepts increases, the practices on the need to possess a high degree of commitment will also increase". [48]

Additionally, there was no significant positive moderate correlation between awareness of environmental issues and problems to the needs to take actions to solve environmental problems (r=0.095; p=0.650) which implies that as the awareness of environmental issues and problems increase, the actions to solve environmental problems are not affected.

"A statistically significant correlation was likewise noted between awareness of environmental issues and problems and the practices on the need to possess a high degree of commitment (r=0.114; p=0.587). This means that the teachers who are aware of environmental issues will more likely to practice the need to possess a high degree of commitment".[48]

"For the students, there was a significant positive moderate correlation between awareness of environmental concepts and the state of environment to the needs to take actions to solve environmental problems (r=0.885; p=0.000) which implies that as the awareness of environmental concepts increase, the actions to solve environmental problems will likely increase".[48]

"Also, the awareness of environmental concepts was significantly positively related to needs to possess a high degree of commitment as revealed by the r- value of 0.879. (p=0.000). This suggests that as the awareness of environmental concepts increases, the practices on the need to possess a high degree of commitment will also increase". [48]

"Further, there was a significant positive moderate correlation between awareness of environmental issues and problems to the needs to take actions to solve environmental problems (r=0.913; p=0.000) which implies that as the awareness of environmental issues and problems increase, the actions to solve environmental problems will likely increase".[48]

"A statistically significant correlation was likewise noted between awareness of environmental issues and problems and the practices on the need to possess a high degree of commitment (r=0.886; p=0.000). This means that the students who are aware of environmental issues will more likely to practice the need to possess a high degree of commitment".[48]

Table 8 shows the correlation between environmental awareness and environmental practices of the respondents.

Table 8. Significant correlation between the level of environmental awareness and extent practices of the respondents

Variable		**Teacher**			**Student**		
Level of	Extent	correlation	p-	Remark	correlation	p-	Remark

environmental awareness	practices		value*			value**	
Environmental concepts and the state of environment	Needs to take actions to solve environmental problems	0.245	0.238	Not Significant	0.885	0.000	Significant
	Needs to possess a high degree of commitment	0.455	0.022	Significant	0.879	0.000	Significant
Environmental issues and problems	Needs to take actions to solve environmental problems	0.095	0.650	Not Significant	0.913	0.000	Significant
	Needs to possess a high degree of commitment	0.114	0.587	Significant	0.886	0.000	Significant

*tested at 0.05 level of significance using Pearson Correlation, ** tested at 0.05 level of significance using Spearman's rho correlation

The findings corroborate previous studies (Gonzaga, 2016; Marpa &Juele, 2016) that "the level of awareness and extent of practices were positively correlated to a moderate degree". Meanwhile, the study of Sharma (2016) counter "the result of the present study that there exists no significant correlation between environmental awareness and environmental practice. College students are aware of the environmental issues but when they are going to practice it, they fail". Owens, (2000) in his study stated that "increase in knowledge and awareness did not lead to pro-environmental behavior".

Problem 6. What instructional materials can be developed in environmental education based on the results of the study?

This section will present the proposed instructional materials that can be developed to improve the awareness and practices of students in environmental education. Based on the result of the study, awareness of environmental concepts and the state of environment, awareness of environmental issues and problems, needs to take actions to solve environmental problems, and practices on the need to possess a high degree of commitment were positively correlated to a moderate degree. The awareness and practices of the students were not high or low but there is a need of suggestions and recommendations in crafting instructional materials to improve the students' awareness in environmental education.

In selecting instructional materials, the results of the study implied these three primary issues must carefully be considered: (a) alignment of environmental education topics and content with national standards, state curriculum frameworks, and existing courses of study; (b) professionally accepted criteria for judging the quality of materials; and (c) the needs, interests, and environmental circumstances of local students.

To assist educators in judging the quality of instructional materials, the NAAEE has produced a guide, Environmental education materials: Guidelines for excellence (1996) that "presents six key characteristics of quality materials. Table 9 presents the guidelines for each of the key characteristics, along with indicators for evaluating materials. Following is an abbreviated outline of the key characteristics and guidelines, accompanied by examples of materials exhibiting some of the quality indicators for each key characteristic".

Table 9. Guidelines for the Six Key Characteristics of Quality Materials in Environmental Education.

Key Characteristics	Guidelines	Indicators
I. Fairness and Accuracy	Environmental education materials should be fair and accurate in describing environmental problems, issues, and conditions, and in reflecting the diversity of perspectives on them.	1.1 Factual accuracy. 1.2 Balanced presentation of differing viewpoints and theories. 1.3 Openness to inquiry. 1.4 Reflection of diversity.
2. Depth	Environmental education materials should foster awareness of the natural and built environments; an understanding of environmental concepts, conditions, and issues; and an awareness of the feelings, values, attitudes, and perceptions at the heart of environmental issues, as appropriate for different developmental levels.	2.1 Awareness. 2.2 Focus on concepts. 2.3 Concepts in context. 2.4 Attention to different scales.
3.Emphasis on Skills Building	Environmental education materials should build lifelong skills that enable learners to prevent and address environmental issues.	3.1 Critical and creative thinking. 3.2 Applying skills to issues. 3.3 Action skills.
4.Action Orientation	Environmental education materials should promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for environmental problem solving and action.	4.1 Sense of personal stake and responsibility. 4.2 Self-efficacy.
5.Instructional Soundness	: Environmental education materials should rely on instructional techniques that create an effective learning environment.	5.1 Learner-centered instruction. 5.2 Different ways of learning. 5.3 Connection to learners' everyday lives. 5.4 Expanded learning environment. 5.5 Interdisciplinary. 5.6 Goals and objectives. 5.7 Appropriateness for specific learning settings. 5.8 Assessment
6.Usability	Environmental education materials should be well designed and easy to use	6.1 Clarity and logic. 6.2 Easy to use. 6.3 Long lived. 6.4 Adaptable.

	6.5 Accompanied by instruction and support. 6.6 Make substantiated claims. 6.7 Fit with national, state, or local requirements.

The present study relates with the study done by N. Paringit (2012), “because it intends to develop an advocacy program after the level of awareness of the respondents are measured”. In the study done by J. Canarias (2005), “his developed lesson exemplars for teachers answered the need of the teachers for resource materials in teaching high school students in doing the tasks of formulating solution, taking action and possessing a high degree of commitment, and advocacy on environmental conservation and protection” (Canarias, 2005).

Based on the results, in crafting instructional materials for environmental education, It is recommended that these three primary issues must carefully be considered: (a) alignment of environmental education topics and content with national standards, state curriculum frameworks, and existing courses of study; (b) professionally accepted criteria for judging the quality of materials; and (c) the needs, interests, and environmental circumstances of local students. This will help maintain and increase the understanding and capacities of the students with relation to environmental problems and environmental sustainability principles.

4. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This section presents the summary the summary of findings, conclusions, and recommendations generated from the results of the study.

4.1 Summary

The study aimed to assess the awareness and practices of students and teachers in environmental education based on their level of awareness in environmental concepts and the state of environment, environmental issues and problems, extent of environmental practices in the needs to take actions to solve environmental problems, and needs to possess a high degree of commitment. This would also suggest and recommends what instructional materials could be developed to improve students understanding in environmental education.

This research employed a descriptive-correlational design. The study was conducted in Montevista Stand Alone Senior High School, Montevista Davao de Oro, Davao Region, Philippines. The respondents involved in the study were the Grade 11 and Grade 12 students as well as teachers. For the selection of the respondents, a random sample design technique was utilized. Survey questionnaires were also used as research instruments and in order to gather the data, a permission letter was given signed by the thesis adviser, the Dean of the Graduate School and the School Principal. The mean, T-test, Analysis of Variance (ANOVA), and Pearson Correlation Analysis were used as a statistical treatment of the study.

Findings revealed that majority of the teacher- respondents were 41-50 years old while majority of the student- respondents were 17-18 years old. In terms of gender of teachers, 60% were females while 40% were males. While 52.80% were females and 47.20% were males for students. 56% of the teachers were teaching in Grade 12, while 44% were teaching in Grade 11. Moreover, 50.40% of the students were Grade 12 while 49.60% were Grade 11. For the students’ strand, 59.20% were Non-STEM while 40.80% belong to STEM Strand.

It also revealed the teacher-respondents were “Very Aware” in environmental concepts and state of the environment as revealed by the overall mean of 4.34 while the student-respondents were “Moderately Aware” as revealed by the overall mean of 3.18. Also, the teacher-respondents were “Very Aware” in environmental issues and problems with an overall mean of 3.89 while the student-respondents were “Moderately Aware” with an overall mean of 2.92.

The study also found out the teacher- respondents “Always” practice the need to take actions to solve environmental problems as revealed by the overall mean of 4.52 while the student-respondents “Often” practice the need to take actions to solve environmental problems as unveiled by overall mean of 3.80. The study also revealed that the teacher- respondents “Often” practice the need to possess a high degree of commitment as revealed by the overall mean of 4.13 while the student-respondents “Sometimes” practice the need to possess a high degree of commitment as unveiled by overall mean of 3.29.

The findings of the study using Pearson Correlation Analysis revealed that for the teachers, there was no significant positive moderate correlation between awareness of environmental concepts and the state of environment to the needs to take actions to solve environmental problems while the awareness of environmental concepts was significantly positively related to needs to possess a high degree of commitment. Additionally, there was no significant positive moderate correlation between awareness of environmental issues and problems to the needs to take actions to solve environmental problems while a statistically significant correlation was likewise noted between awareness of environmental issues and problems and the practices on the need to possess a high degree of commitment.

Further, it was revealed that for the students, there was a significant positive moderate correlation between awareness of environmental concepts and the state of environment to the needs to take actions to solve environmental problems while awareness of environmental concepts was significantly positively related to needs to possess a high degree of commitment. On the other hand, it was found out that there was a significant positive moderate correlation between awareness of environmental issues and problems to the needs to take actions to solve environmental problems while a statistically significant correlation was likewise noted between awareness of environmental issues and problems and the practices on the need to possess a high degree of commitment.

Based on the results, the instructional materials that will be crafted for environmental education, will focus on these three primary issues: (a) alignment of environmental education topics and content with national standards, state curriculum frameworks, and existing courses of study; (b) professionally accepted criteria for judging the quality of materials; and (c) the needs, interests, and environmental circumstances of local students.

4.2 Conclusions

The study concluded that majority of the teacher- respondents were 41-50 years old while majority of the student- respondents were 17-18 years old. It was also concluded that the teachers have higher awareness compared to students because of their greater exposure and experiences. Students are moderately aware of environmental concepts and state of the environment; and in environmental issues and problems. The teacher-respondents often practice the need to take actions to solve environmental problems and often practice the need to possess a high degree of commitment. Meanwhile, student-respondents sometimes practice the need to take actions to solve environmental problems and sometimes practice the need to possess a high degree of commitment. For the students, there is a significant high positive relationship between environmental awareness and environmental practices while there are significant relationships among the variables of environmental awareness and environmental practices.

4.3Recommendations

Based on the findings and conclusion of the study, the following recommendations were considered:

1. Teachers are encouraged to strengthen the integration of environmental concepts, principles, and practices in various subjects in the high school level.
2. Schools’ are encouraged to institutionalize different environmental programs and projects for students as well as the teachers to actively participate in.

3. The education sector may apply the results on awareness as their basis in enhancing the program and include Environmental Education topics in making learning activity sheets and modules in the senior high school curriculum to raise awareness and promote campaigns on environmental conservation.
4. Environmental programs and projects in the school and likewise in the community are encouraged to be sustained through adequate funding, support of the teachers, and actively participation of various student organizations.
5. The students' observation in the community's environmental activities are encouraged to be included to further elaborate the environmental practices not only in school and at home.
6. It is encouraged that the instructional materials crafted from the results of this study will be utilized by the District and Schools Division where the researcher is currently teaching.
7. Further study are encouraged to be conducted by future researchers or experts of the field for further validation of the effectiveness of this approach. Other parameters shall be considered in determining the knowledge and awareness of students and teachers on Environmental Education.

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