

Environmental knowledge and sensitivity of Senior High School Students

John Mark E. Abilo¹ and Joji D. Linaugo²

¹Binalbagan National High School, Binalbagan, Negros Occidental, Philippines

²Department of Education – Division of Negros Occidental, Bacolod City, Philippines

ABSTRACT

*This descriptive-correlational study aimed at determining the levels of environmental knowledge and sensitivity of senior high school students. The relationship between environmental knowledge and sensitivity was likewise determined. The respondents were the 194 Grade 11 students classified according to their sexes and strands and were selected through stratified proportional random sampling. This study utilized the “Environmental Knowledge Test”, and the “Environmental Sensitivity Questionnaire”. The statistical tools used were mean and standard deviation for descriptive statistics. *t*-test, Pearson’s *r* and One-Way Analysis of Variance all set at 0.05 were employed as inferential statistical tools. Findings showed that the students had average level of knowledge and sensitivity. Findings also revealed that there was no significant difference in students’ level of knowledge when grouped according to sex and there is a significant difference when they were grouped according to their strands. A significant difference in the students’ environmental sensitivity was observed when they were grouped according to sex and there was no significant difference in their level of environmental sensitivity when they were grouped according to strands. Furthermore, no significant relationship was found to exist between the students’ environmental knowledge and sensitivity.*

Keywords:

Science Education
Environment
Knowledge
Sensitivity
Descriptive-correlational design
Central Philippines

Introduction

In 2015, member states of the United Nations (UN) adopted a set of goals to end poverty also known as the Sustainable Development Goals (SDG). A lot of these goals concern our environment and sustainable development (United Nations, 2016). Sustainable development is not only a challenge in our society, but also for education institutions, which have been rapidly including sustainable development in their scholastic process in the last two

decades (Terlević, Istenič Starčić, & Šubic Kovač, 2015).

Mankind in its bid to make life more comfortable, has become environmentally thoughtless. Technological innovation has little admiration for environmental protection; the motivating factor being fundamentally profitable and executable (Oebanda, 2009). The evidence of man’s impact in his life-support system is proliferating (Chapin et al., 2011; Furqan, Mat Som and Hussin, 2017; Sibly, 2015).

Knowledge, surveys were first used in the 1950s to discover how the concept of family development was received, understood and practiced by different populations across the world (Launiala, 2009). The basic principles of the knowledge surveys are that knowledge affects attitude and that both education and philosophy are the building blocks for exercise. These studies are used in three general purposes: as a diagnostic tool to define the population's current knowledge; to offer insights on an ongoing situation in scheming specific interventions; and as a tool to evaluate the efficacy of particular involvements or programs (Vandamme, 2009). Environmental knowledge was not significantly related to attitudes (Levine & Strube, 2012).

Environmental sensitivity is being prepared to make real attempts against ecological problems (Cabuk & Karacaoglu, 2003; Caliskan, 2002). In such a case, development of the environmental sensitivity in individuals can be possible through hovering the level of consciousness and raising the level of awareness can be conceivable through environmental education (Cabuk & Karacaoglu, 2003). Environmental sensitivity contains a dynamic structure that can develop during the course of life. In the development of the environmental sensitivity, families, educational institutions, mass media, and non-governmental organizations play a significant role (Turkum, 1998).

The present curriculum strongly adheres to the integration of environmental education. It is obviously shown in the implementation of their programs like the DepEd Order No. 52, s. 2011 entitled "Strengthening Environmental Education in Public and Private Schools" which contains the mandate for the establishment of Youth for Environment in Schools Organization (YES-O) in public and private schools. In addition, DO 5, s. 2014 serves as the Implementing Guidelines on the Integration of Gulayan sa Paaralan, Solid Waste Management and Tree Planting Under the

National Greening Program (NGP). These programs were only a few of the regulations which our school failed to comply and advance.

This study determined the environmental knowledge and sensitivity, and their variations, of the students studying at a Senior High School in Central Philippines. The main purpose of this study is to address the common problem of the environment by measuring students' knowledge and relate it to environmental sensitivity. This work hopes to design and implement programs that will allow students to understand things about the nature of the environment and for them to practice stewardship which was the niche they have to perform to their full potential.

This study sought answers to the following questions: (1) What is the level of the students' environmental knowledge when taken as a whole and when grouped according to sex and strand? (2) What is the level of the students' environmental sensitivity when taken as a whole and when grouped according to sex and strand? (3) Is there a significant difference in the level of students' environmental knowledge when grouped according to sex and strand? (4) Is there a significant difference in the level of students' environmental sensitivity when grouped according to sex and strand? (5) Is there a significant relationship between the students' environmental knowledge and environmental sensitivity?

Framework of the Study

This study anchored on the Affective-Cognitive Experiences for Self-Integration Approach (ACES) which is premised on the simultaneous development of both the cognitive and the affective dimensions of the Learner (Punzalan et al., 1999), and anchored on the Confluent Theory of education. Francke & Erkens, (1994) held that the later model is presented as a method to bridge the gap between cognitive and affective domain. Attention focused on the integration of four overlapping areas in a

learning process (readiness, the cognitive domain, the affective domain, and responsibility). Confluent education was introduced in the 1960s and 1970s as a "flowing together" of the cognitive and emotional domains but evolved into various dimensions of learning (Hackbarth, 1996; in Solomon, 2000).

Confluent educators have a rich 25-year tradition of theory and practice which recognize the centrality of the learner in the educational process. In a confluent model, deep learning is achieved by facilitating self-awareness and personal responsibility and by understanding the dynamics of planned change. (Cline, 1999) Both cognitive and affective goals can be attained through a choice of any number of instructional strategies in any particular subject area. The suitable approach focuses on discussion and problem solving through the use of reasoning in an atmosphere of openness, tolerance, and concern for others (Vare, 1979) (Fitzmaurice & Jones, 1981).

The environment in the broadest sense is equivalent to the region surrounding or circumstances in which anything exists. It consists of natural resources such as water, air, rocks, soil, and sediments; all contribute and support life on Earth. To survive, humans must exploit and modify parts of nature not knowing that the intrusion means the multiplication of effects, most of which are unpredictable (Mukherjee, 2002; Oebanda, 2009).

Since the publication of *Our Common Future* (World Commission on Environment and Development, 1987) and *Agenda 21* (United Nations Conference on Environment and Development, 1992), the thought of sustainable development has been part of people's daily lives and has been involved in many activities (Terlević et al., 2015).

Along with this line, the Binalbagan National High School Senior High School, a public institution of higher learning has highlighted in its curricular and co-curricular programs the value of environmental friendliness. One of the

challenges concerning the system is to develop studies which may give concern, prudence, and sensitivity about the issues confronting nature.

Within the scope of the scientific studies related to the environment, several variables such as environmental attitude, environmental awareness, and environmental sensitivity were examined. There are various studies regarding the relationship between these variables both abroad (Blair, 2008; Pooley, O'Connor, 2000; Cetin, Ertepinar & Geban, 2004; Ozbay, 2010; Sama, 2003; Scroll & For, 2010; Tunc-Ozbebek, Omur-Akdemir & Duren, 2012). Also, domestically (Roto, 2014; Oebanda, 2009). When the related literature is examined, it is seen that there is a limited number of studies aiming to determine the sensitivity of the student towards the environment in general.

Environmental sensitivity has developed over time and has equipped the ground for the formation of the environmental policies, and these were followed by legal regulations, development plans and government programs (Keles, 2002).

It was assumed that improved knowledge about the environment promotes positive attitudes. Some researchers have reported that junior high school students exposed to environmental courses demonstrated an increase in accountable environmental behavior and an increased awareness of environmental issues (Bradley, et al., 1999; Kassas, 2002; Stevenson, 2007; Carleton-Hug & Hug, 2010)

Environmental education programs directing to enhance children's environmental awareness in a pro-environmental direction requires background information, such as age and sex differences, to ensure appropriate design (Liefländer & Bogner, 2014) (Roto, 2014). Studies by Roto (2014), show that sex is an important variable that could determine the extent of environmental awareness of students. Participation in an environmental education program affected girls and boys differently. 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 will determine the level of environmental knowledge and sensitivity of the senior high school students and also the relationship among the two dependent variables. The identified independent variables include the sex and strand of the respondents. The process involves the administration of assessment test and questionnaires for the researcher to design appropriate intervention program.

Methodology

This study employed the descriptive-correlational type of research. The study was conducted at a state Senior High School in Negros Occidental, Central Philippines. The respondents of the study included the Grade 11 students for the academic year 2017-2018. Using Yamane's formula, a sample size of 194 was obtained. The data are shown in Table 1.

Table 1. Distribution of respondents when grouped according to Tracks.

Category	N	%	n
Academic Track	326	86.70	169
<i>HUMSS</i>	262	69.68	136
<i>ABM</i>	64	17.02	33
TVL Track	50	13.30	25
<i>EIM</i>	50	13.30	25
Total	376	100	194

The researchers sought permission from the Administration to conduct the study and to avail of the list of all the Grade Eleven Senior High School Students.

Two quantitative instruments were used in the study: Test on Environmental Knowledge, designed to measure knowledge of environmental concepts, principles, as well as issues and problems,

and Environment Sensitivity Questionnaire to measure the respondents' sensitivity to the natural environment. Both tests were modified from (Oebanda, 2009). The validity of the revised instruments was determined using the validation method set forth by Good and Scates for face validity and validation set by Lawshe for the content validity. Both the instruments undergone jury validation composed of five jurors. The environmental knowledge test got the total average of 4.73 and the environment sensitivity questionnaire got the total average of 4.76 for the face validity, both are interpreted as very good and all items are considered as essential using the tool on content validity ratio (CVR). The reliability of the Environmental Knowledge Test was determined using Kuder Richardson Formula 21 which obtained 0.91 which was interpreted as highly reliable and for the Environment Sensitivity Questionnaire the researcher used Cronbach's Alpha which obtained 0.89 which was also interpreted also as highly reliable.

For the environmental knowledge test, each correct answer was given a score of one point, while a wrong answer was given a zero rating. The test scale against which the respondents' level of knowledge was classified as follows:

Score Range	Description
0 - 6.99	very low level of knowledge
7 - 13.99	low level of knowledge
14 - 20.99	average level of knowledge
21 - 27.99	high level of knowledge
28 - 35.00	very high level of knowledge

For the environmental sensitivity questionnaire, the following scale of means with corresponding descriptions was used to interpret the scores of the respondents:

Scale	Description
1.00 – 1.79	Very Low Level of Environmental Sensitivity
1.80 – 2.59	Low Level of Environmental Sensitivity

- 2.60 – 3.39 Average Level of Environmental Sensitivity
- 3.40 – 4.19 High Level of Environmental Sensitivity
- 4.20 – 5.00 Very High Level of Environmental Sensitivity

Results and Discussion

The descriptive findings characterized the level of students’ environmental knowledge and the level of sensitivity as a whole group and across different sexes and strands.

Table 2 shows the students’ level of environmental knowledge when taken as a whole group and when grouped according to sex and track.

Table 2. Level of Students’ Environmental Knowledge when taken collectively and when grouped According to Sex and Strand.

Variables	Categories	Mean	SD	Int
Sex	Male	16.63	4.45	Average
	Female	16.32	4.16	Average
Strand	ABM	17.91	3.63	Average
	HUMSS	15.78	4.29	Average
	EIM	18.04	4.08	Average
As a Whole		16.43	4.26	Average

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)

Table 4. Difference in the Level of Students’ Environmental Knowledge when Grouped According to Strand

Source of Variation	SS	Df	MS	F	p-value	F crit
Between Groups	194.56	2.00	97.28	5.62	0.00**	3.04
Within Groups	3,307.07	191.00	17.31			
Total	3,501.63	193.00				

**Post Hoc tests using series of t-tests show that significant differences lie between HUMSS and ABM (p-value = 0.00) and AMB and EIM (p-value = 0.01).

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.

Table 3. Level of Students’ Environmental Sensitivity when taken as a Whole and when Grouped According to Sex and Strand.

Variables	Categories	Mean	SD	Int
Sex	Male	3.56	1.11	High
	Female	3.29	1.19	Average
Strand	ABM	3.42	1.13	High
	HUMSS	3.35	1.19	Average
	EIM	3.59	1.06	High
As a Whole		3.39	1.17	Average

This result contradicted Roto’s (2014) findings that female students have higher awareness than male students. The fact that the mean score of male students was higher than the female scores, this only showed that the male group was more exposed theoretically on issues concerning the environment than the female students. Her findings were also opposing to the studies of Arcury and Christianson (1990) which showed that men were more environmentally concerned than women.

This study also aimed at determining the significant differences in the students’ level of environmental knowledge and their level

of the environmental sensitivity according to their sex and strand as well as the significance of the relationship between the students' environmental knowledge and environmental sensitivity.

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' level of

environmental knowledge when respondents were grouped according to their sexes.

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.

Table 5. Difference in the Level of Students' Environmental Sensitivity when Grouped According to Sex

Variables	Categories	Mean	SD	<i>p</i> - value	Decision	Significance @ $\alpha= 0.05$
Sex	Male	3.56	1.11	0.00	Reject H _o	Significant
	Female	3.29	1.19			

Table 6. Difference in the Level of Students' Environmental Sensitivity when Grouped According to Strand

Source of Variation	SS	Df	MS	F	<i>p</i> -value	F crit
Between Groups	1.30	2.00	0.65	1.92	0.15	3.04
Within Groups	64.49	191.00	0.34			
Total	65.79	193				

The significant difference in students' environmental sensitivity when grouped according to their sexes was also reinforced by Roto (2009) findings that there was a significant difference in students'

		Environmental Knowledge
Environmental Sensitivity	Sig. (2-tailed)	0.17
	N	194

environmental awareness when considering their sexes males are more sensitive than females.

The result merely implied that students, whatever strands they might belong may have the same level of environmental sensitivity and was also validated by the findings of Oebanda (2009). In her study, she concluded that there was no significant difference in the level of students' environment sensitivity across degree programs or courses.

The test of significant relationship revealed an r value of 0.17 magnitude of correlation. Thus, there was no significant relationship found between the students' environmental knowledge and their environmental sensitivity.

Table 9. Relationship between the Students' Environmental Knowledge and Environmental Sensitivity

This means that a good level of knowledge among students may not necessarily lead them to engage in the right environmental practice. This finding was similar to Tikka, Kuitunen, and Tyns (2000), Barrett and Kuroda (2002) and Ehrampoush and Moghadam (2005). It also revealed the environmental knowledge-behavior gap that existed among youth (Creech, Buckler, Innes, & Larochele, 1999). According to Creech et al. (1999), youth are aware of the

problem, but they do not know how to make it “personal” or how to deal with it.

Conclusions

Results of the study implied that the students might have acquired knowledge to help them understand to a certain extent the basic environmental concepts, theories, and laws, but this knowledge may not be substantial for them to understand and analyze more complex environmental complex, principles, and problems.

The average level of environmental knowledge of the grade eleven students may be accountable for the quality of the students’ high school preparation in the natural sciences as well as their lack of interest in these fields.

Probably, the students' knowledge may improve if they were more exposed to teaching strategies that could make them explore and appreciate the natural environment better.

On the other hand, the students' score in the environmental sensitivity test was perhaps because students may not have appreciated the importance of environmental protection and conservation in the fullest sense as well as possessing the quality of environmental sensitivity.

The insignificant relationship between students’ environmental knowledge and their environment sensitivity indicated that adequate environmental knowledge might not be an essential factor in producing environmentally sensitive individuals. From this finding, it can be inferred that students with higher levels of environmental knowledge may not enable them to show a more profound commitment to environmental causes and may thus guide them to make intelligent decisions on environmental concerns.

With this, the present curriculum has already the inclusion of different subjects and programs relating to environmental concerns. The core subjects offered to all strands in the senior high school have included earth and life science where the

protection of the environment is given focus. Also, programs like tree planting and growing and establishment of ecological center that is composed of material recovery facility (MRF), tree nursery, and organic garden was introduced to develop both their knowledge and sensitivity to our environment.

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