

## **Environmental Awareness, Literacy and Biodiversity Conservation Practices of Freshmen Stu- dents in Bukidnon State University, Philippines**

**LYNNETTE A. EJEM**

ORCID no. 0000-0002-5297-7118  
[lynnetteasuncion26@gmail.com](mailto:lynnetteasuncion26@gmail.com)

**ALWIELLAND Q. BELLO**

ORCID no. 0000-0002-2298-3939  
[alwielland@gmail.com](mailto:alwielland@gmail.com)

Natural Sciences Department, Bukidnon State University  
Fortich Street, Malaybalay City, 8700 Bukidnon, Philippines

### **ABSTRACT**

The teaching of biodiversity conservation in the university level is a laudable effort of teachers. The study ascertained the environmental awareness, literacy and biodiversity conservation practices of college freshmen students in Bukidnon State University (BukSU), Malaybalay City, S.Y. 2012-2013. Data on the students' level of awareness were gathered using the survey questionnaire on environmental awareness. Generally, the BukSU college freshmen students were "very much aware" of the environmental concepts on balance of nature, pollution, stewardship, finiteness of resources, change, interdependence, diversity and stability. The freshmen students are "moving towards mastery" on environmental knowledge, environmental attitudes and values and environmental application and decision making skills. The students "often" practice biodiversity conservation measures at home, in school and in the community.

**Keywords-** Environmental Science, environmental awareness, environmental literacy, biodiversity conservation practices, survey assessment, descriptive method, Philippines

## INTRODUCTION

According to Hungerford and Volk (1990), responsible citizens are those people who have an awareness and sensitivity to the total environment and allied problems and issues. Responsible citizens have the feelings of concern for the environment and motivation for actively participating in environmental improvement and protection. They have also the skills for identifying and solving environmental problems. If human beings become more knowledgeable about environmental concerns, they would in turn, become more aware of the environment and its problems. Thus, they would be more motivated to act toward the environment in more responsible ways. Therefore, it can be assumed that as students are exposed to the environment and its problems, their level of environmental awareness would be increased. These would prompt them to make appropriate actions for the environment and would enable them to display a responsible environmental behavior.

Environmental education is vital to enhance students' knowledge about the environment; develop students' concern towards the environment and for them to help conserve and protect environmental resources. The study is anchored on Palmer and Neal's (2004) model on Environmental Education, which consists of three components: (a) Education about the Environment (builds awareness, understanding, and the skills in understanding the environment); (b) Education in (or from) the Environment (learning outside the classroom or in nature); and, (c) Education for the Environment (has objectives related to nature conservation and sustainable development).

The goals of environmental education are to raise awareness of and knowledge about environmental issues, to develop skills in identifying, preventing, and solving environmental problems. Environmental education also fosters attitudes of concern for the environment and motivations to help protect it, and creates new patterns of behavior of individuals, groups, and society towards the environment (Guzman & Guzman, 2000).

Assessment on the level of environmental awareness, environmental literacy, and biodiversity conservation practices of the students can provide baseline data to evaluate the effectiveness of environmental education programs in raising environmental literacy which is an important indicator of environmental stewardship.

## OBJECTIVES OF THE STUDY

The study ascertained the: 1) level of environmental awareness of BSU college freshmen along the following core messages: 1.1. Balance of Nature, 1.2. Pollution, 1.3. Stewardship, 1.4. Finiteness of Resources, 1.5. Change, 1.6. Interdependence, 1.7. Diversity and Stability; 2) Environmental literacy level of the BSU college freshmen in 2.1. Environmental knowledge; 2.2. Environmental attitudes and values, and 2.3. Environmental application and decision-making skills; 3) frequency of biodiversity conservation practices of BSU college freshmen – 3.1. At home, 3.2. In school, and 3.3. In the community.

## METHODOLOGY

The study employed the descriptive method of research. Data for the BSU freshmen's environmental awareness were gathered through the Environmental Awareness Questionnaire (Napere, 2009) and the students' environmental literacy was gathered through the Environmental Literacy Test (Valdoz, 1999 & Tayawan, 2013). The conservation practices of the BSU freshmen were determined through the Conservation Practices Instrument developed by Tayawan (2013).

The sample size of 355 Freshmen taken from the total population of 3,555 freshmen was determined using Slovin's formula, apportioned from five colleges (College of Arts & Sciences- 62; College of Community Education and Industrial Technology-74; College of Teacher Education- 75; College of Business Administration, Hospitality and Public Governance- 140; College of Nursing-5). There were 12 freshmen who composed the focus group; they answered the motive questions developed by the researchers for this study. They were also asked on their opinions regarding their responses to the items in the instruments.

## RESULTS AND DISCUSSION

### Environmental Awareness

The freshmen students in Bukidnon State University were found to be “very much aware” about the environment on the seven core messages- Balance of Nature, Pollution, Stewardship, Finiteness of Resources, Change, Interdependence, Diversity and Stability. On the theme on Balance of Nature, the freshmen students were very much aware for example “*Trees help hold the soil so that it is not washed away every time it rains*”; “*Our support to the clean and green program will help to preserve the beauty of*

*nature*”; and “*Our task is to help preserve the balance, harmony and completeness of nature.*” The students have seen how some places in the country were adversely affected by flash floods, soil erosion and habitat destruction. There were also some students who had experienced the devastating effects brought about by the recent typhoons (like here in the Philippines. With these negative effects of illegal logging and cutting of trees, the students have realized how significant the forests are in maintaining balance in ecosystems.

Table 1. BSU freshmen students’ awareness on the core message on Balance of Nature

Environmental Core Messages	Mean	QS
<b>I. BALANCE OF NATURE</b>		
1. An appreciation of the beauty of Nature enhances one’s commitment to protect it.	4.57	VMA
2. Our main concern is not just to preserve its quality and beauty.	4.37	VMA
3. Our task is to help preserve the balance, harmony and completeness of nature.	4.62	VMA
4. Our support to the Clean and Green program will help to preserve the beauty of nature.	4.72	VMA
5. The Philippines is rich in natural resources.	4.48	VMA
6. The DENR is the primary government agency responsible for environmental management.	4.47	VMA
7. Trees help hold the soil so that it is not washed away every time it rains.	4.75	VMA
8. The denudation of forests results to soil erosion and flash floods.	4.53	VMA
Mean of means =	4.58	VMA

Legend: QS- Qualifying Statement; VMA- Very Much Aware

On the core message on Pollution, the items that got the highest means were “*Smoking can cause diseases*”; “*Many diseases are caused by man’s destruction of the environment*”; and “*We should be against the pollution of the environment, land, sea and air*”. The students said that they were taught by their parents, elementary and high school teachers and even through the media that smoking is not good to their health.

The freshmen students are very much aware that destruction of the environment due to different forms of wastes dumped into the environment had caused various kinds diseases – skin diseases, respiratory diseases, gastro-intestinal diseases, etc. They have learned about these concepts from school, TV, print, media and had seen many people (and even some of them) had been afflicted by some of these diseases.

Table 2. BSU freshmen students’ awareness on the core message on Pollution

II. POLLUTION	Mean	QS
1. We should be against the pollution of the environment; land, sea and air.	4.62	VMA
2. Highly developed or industrial nations bear much of the responsibility for pollution of the sea.	4.24	VMA
3. Chemical fertilizers and insecticides do immense damage to the natural vitamins and minerals of the soil.	4.38	VMA
4. Pollution not only diminishes the quality of life, it dramatically shortens the life itself.	4.39	VMA
5. Some pollutants can be efficiently transformed into useful materials.	4.03	VMA
6. Pollution can be minimized if people give attention to it.	4.52	VMA
7. The burning of garbage and waste materials can contribute to the greenhouse effect.	4.52	VMA
8. Using aerosol sprays contribute to ozone depletion.	4.24	VMA
9. Smoking can cause diseases.	4.68	VMA
10. Many diseases are caused by man’s destruction of the environment.	4.62	VMA
	4.42	VMA

For the core message on Stewardship, BSU freshmen students are very much aware that *“Every Man, every community and every nation is accountable for the proper management of the Earth”*; *“Nature provides everything that is necessary to sustain life”*; and *“Every individual is a steward of nature”*. The freshmen students said they know that every individual – student, professionals, leaders, etc. have the responsibility of taking good care of the resources in the environment since all that we need are provided for by the environment.

Table 3. BSU freshmen students' awareness on the core message on Stewardship

III. STEWARDSHIP	Mean	QS
1. Every individual is a steward of nature.	4.54	VMA
2. Large and rapid population growth puts pressure on the environment.	4.38	VMA
3. The environment cannot catch up with the population's demand for its resources unless people learn how to manage and utilize resources.	4.44	VMA
4. Every man, every community and every nation is accountable for the proper management of the Earth.	4.60	VMA
5. Stewardship makes you aware that the more you utilize resources, the greater is your responsibility to preserve such resources.	4.36	VMA
6. Irresponsible stewardship will result to poverty.	4.16	VMA
7. Nature provides everything that is necessary to sustain life.	4.58	VMA
Mean of Means=	4.43	VMA

The first three items with highest means for the core message on Finiteness of Resources are “*Water is the most important resource of human being; therefore we should use it wisely*”; “*The tree planting program develops deep sense of responsibility in nation building and a more healthful environment*”; and “*The careless cutting of trees and the kaingin system have resulted into reckless destruction of our forests*”. The students know that water is an important resource and is needed for the survival of organisms. They are also exposed to tree planting activities in the country – tree planting is usually a project in schools and in many government agencies to help restore the denuded forests. The item that has the lowest mean in this theme is “*Indigenous cultural communities have become marginalized due to the loss of their ancestral domain and resources base*”. Students' level of awareness is only “much aware”. The students were not yet familiar with the ethnic tribes and the property rights of the various minority groups in their places.

Table 4. BSU freshmen students’ awareness on the core message on Finiteness of Resources

IV. FINITENESS OF RESOURCES	Mean	QS
1. Habitat destruction and pollution are reducing the Earth’s biological diversity.	4.46	VMA
2. Indigenous cultural communities have become marginalized due to the loss of their ancestral domain and resources base.	4.16	MA
3. The major problems of community resources management are forest degradation, plant and animal extinction and coral ecosystem destruction.	4.48	VMA
4. Some of the natural resources are diminished and destroyed by irresponsible people.	4.59	VMA
5. The careless cutting of trees and the kaingin system have resulted into wanton destruction of our forests.	4.69	VMA
6. As population increases, the demand for resources also increases.	4.53	VMA
7. The tree planting program develops deep sense of responsibility In nation building and a more healthful environment.	4.80	VMA
8. Water is the most important resource of human being; therefore we should use it wisely.	4.88	VMA
Mean of means=	4.57	VMA

For the core message on Change, the freshmen students are “very much aware” that “*Natural foods are more healthful compared to processed ones*”; “*Recycling of solid waste into compost and organic fertilizer is a better way of preventing depletion of soil fertility*”; and “*The most rewarding process in the utilization of other hazardous substances is through recycling.*” According to the students, these concepts have been well disseminated in schools, through TV and by different environmental organizations.

For the core message on Interdependence, the items with highest means are “*Living things cannot live without the environment*”; “*Forests provide food and medicine. They also provide other vital resources*”; and “*Resources are affected by population size, land and resource management*”. These concepts were accordingly emphasized to the students in school. The students have seen the negative consequences of deforestation; it has brought flash floods, erosion, habitat destruction for various endemic species and has even contributed to climate change.

On the core message on Diversity and Stability, the item that got the highest mean is “*Wise utilization of natural resources will provide prosperity throughout generations.*” Freshmen students said that they were taught in most of their science classes

that to sustain the needs of the present generation and the generations to come, every citizen or member of the society has to conserve and protect our natural resources.

Table 5. BSU freshmen students' awareness on the core message on Change, Interdependence and Diversity and Stability

<b>V. CHANGE</b>	Mean	QS
1. Over the past century, the average global temperature has increased significantly.	4.47	VMA
2. Natural foods are more healthful compared to processed ones.	4.65	VMA
3. Environmental degradation results from lack of appreciation for nature.	4.43	VMA
4. Recycling of solid waste into compost and organic fertilizer is a better way of preventing depletion of soil fertility.	4.59	VMA
5. Toxic and hazardous wastes, when improperly handled and unregulated can create havoc not only on humans but on the environment.	4.18	VMA
6. The most rewarding process in the utilization and other hazardous substance is through recycling.	4.54	VMA
Mean of means=	4.88	VMA
<b>VI. INTERDEPENDENCE</b>		
1. Forests provide food and medicine. They also provide other vital resources.	4.67	VMA
2. Human beings are product of heredity and environment.	4.61	VMA
3. Most farmers use chemical and pesticides which are detrimental to health, therefore they should be banned. Other alternatives must be used.	4.48	VMA
4. Living things cannot live without the environment.	4.76	VMA
5. Resources are affected by population size, land and resource management.	4.66	VMA
Mean of means=	4.63	VMA
<b>VII. DIVERSITY AND STABILITY</b>		
1. Undisturbed natural resources preserved as wildlife areas are of great value in perfecting and perpetuating endangered species.	4.44	VMA
2. A sustainable society is one that satisfies its needs without jeopardizing the prospects of the future generations	4.49	VMA



3. Wise utilization of natural resources will provide prosperity throughout generations.	4.60	VMA
Mean of means=	4.51	VMA
Overall Mean=	4.48	VMA

### Environmental Literacy

Generally, the BSU freshmen’s level of environmental literacy is “moving towards mastery” or MTM, which means that they have very satisfactory literacy on environmental knowledge, environmental attitudes and environmental application and decision making skills (refer to the overall result in Fig.1). The freshmen students have not yet fully internalized some environmental concepts and have not fully developed the necessary attitudes and values, application and decision making skills toward the protection and conservation of the environment.

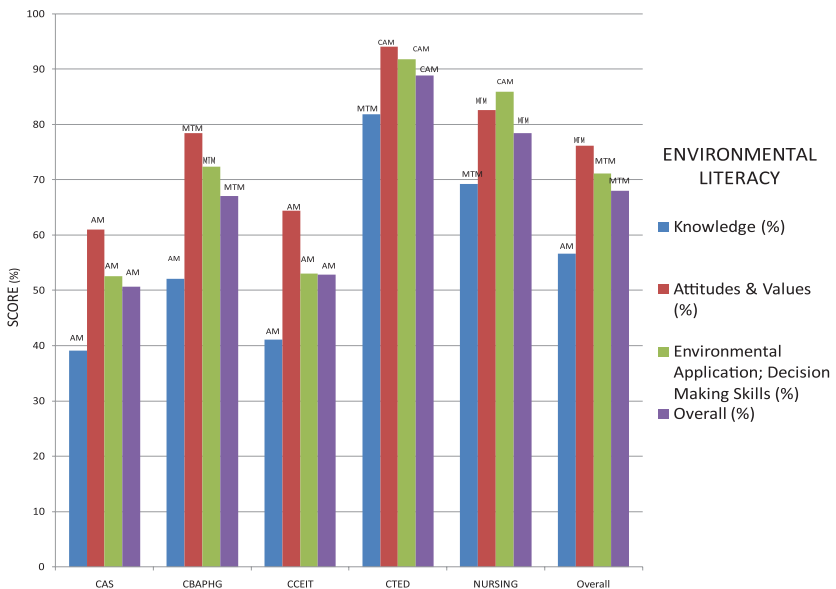


Fig. 1. Environmental literacy of BSU freshmen from the five colleges of the university

On the knowledge component of environmental literacy, only 20.6 % of the freshmen have environmental literacy level of “mastered” while the greater percentage

is in the “average mastery level” (Fig. 2) which means that 35.93% freshmen students have “satisfactory literacy on environmental knowledge”. On the component of Attitudes and Values, a greater percentage of the BSU freshmen are on the “closely approximating mastery level” which means that 36.67% have “excellent literacy on environmental attitudes and values (Fig.3). The experiences they have encountered on the ill effects of deforestation and pollution may have made them realize that we should be concerned with environmental protection and conservation. On the component of Application and Decision making skills, 33.37% have “MTM” or moving towards mastery level. These freshmen have “very satisfactory literacy on environmental application and decision making skills” (Fig.4).

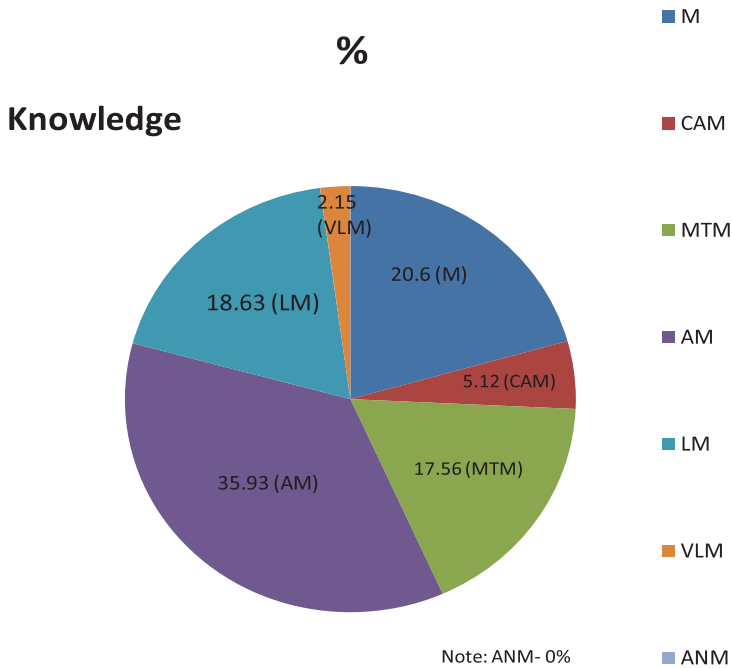


Fig. 2. The percentages of the levels of environmental literacy (Knowledge Component) among BSU freshmen

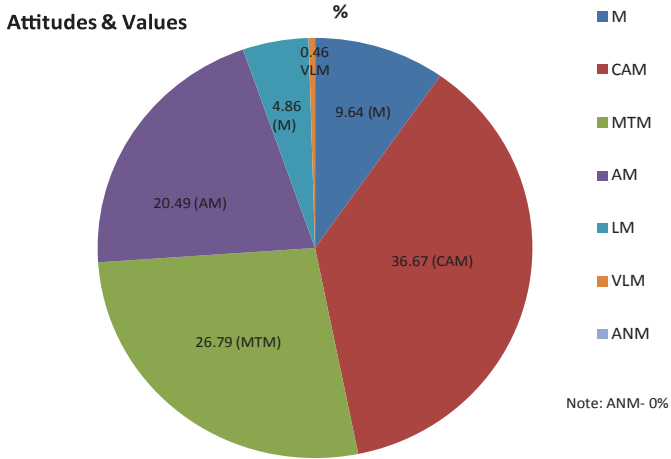


Fig. 3. The percentages of the levels of environmental literacy (Attitudes & Values Component) among BSU freshmen

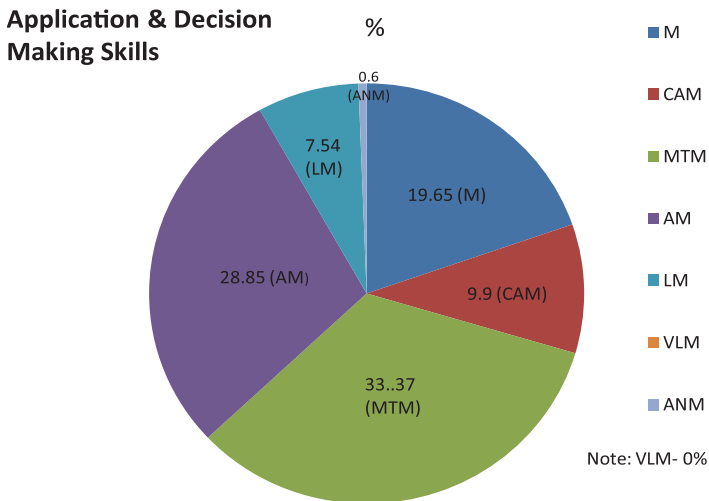


Fig. 4. The percentages of the levels of environmental literacy (Application and Decision Making Skills) among BSU freshmen

### Biodiversity Conservation Practices

**At Home.** By and large, the BSU freshmen students *often* practice conservation measures at home. As shown in Table 6 below, the conservation measure that got the highest mean is “*I close faucets and other passageways properly after use*”. The said item is “always” practiced because students said they have to conserve water since it is a very important resource needed for human survival and by doing this they can also save money for the payment of water bills. The item that got the lowest mean is “*I buy organic and locally grown food without synthetic pesticides or fertilizers*”. This is because organically grown foods are accordingly more expensive, thus they do not usually buy vegetables and fruits that are organically grown.

Table 6. Biodiversity conservation measures BSU freshmen at home

<i>At Home</i>	Mean	QD
1. I take good care of my pet and other domesticated animals like dogs, cats, chicken by giving them food and shelter.	4.09	O
2. I take responsibility for cleaning our backyard.	4.09	O
3. I water our plants and pull weeds and grasses around it.	3.90	O
4. I do segregation of biodegradable, non-biodegradable and recyclable waste material.	4.04	O
5. I encourage my parents to bring endangered species of animal or plant to proper authorities whenever they bring one to our home.	3.60	O
6. I talk to my siblings about how to take good care of our animals and plants at home and not treating them as toys.	3.96	O
7. I help my parents do composting to provide organic fertilizers and minimize organic wastes around us.	3.78	O
8. I do backyard gardening which utilizes organic fertilizers.	3.83	O
9. I talk to my parents and siblings on the present environmental problems and sharing ways to help conserve our natural resources.	3.68	O
10. I make myself updated with the current environmental issues in the internet or by reading newspapers.	3.77	O
11. I turn off the lights, televisions, computers and other electrical appliances when they are not in use.	4.52	O
12. I close faucets and other water passages properly after every use.	4.60	A
13. I turn off the lights, televisions, computers and other electrical appliances when they are not in use.	3.91	O
14. I buy organic and locally grown food without synthetic pesticides or fertilizers.	3.50	O

15. I encourage parents to support local growers or farmers.	3.98	O
Mean of means=	3.92	O

**Legend:** QD- Qualitative Description; A- Always; O-Often

**In School.** Generally, BSU freshmen students *often* practice biodiversity conservation measures in school. However, as reflected in Table 7, the items on “*I turn-off the lights, televisions, computers and other electrical appliances when they are not in use*” and “*I close faucets and other water passages properly every after use*” are always practiced by the students. The students said they were made to do this practice at home and have carried their training to school. They were also constantly reminded by their teachers in school to conserve energy and water. The students also “*always*” practice the item on “*I do not prick/cut flowers in our flower garden/in the campus*”. Accordingly, “no picking or cutting of flowers” is strictly implemented in schools, so students are afraid to break this “rule”. The item that got the lowest mean is “*I segregate biodegradable, non-biodegradable and recyclable waste material*”. Students think that this could be done by janitors or its part of the janitors’ job. The freshmen students also observed that “the trash cans for different types of garbage are lacking in the campus and are not strategically located”.

Table 7. Biodiversity conservation measures of BSU freshmen in school

<i>In School</i>	Mean	QD
1. I pick up wrappers or pieces of papers when I see them in the campus,	3.64	O
2. I do not prick/cut flowers in our flower garden/in the campus.	4.21	A
3. I help water the plants in our school flower gardens/landscaped areas in the campus.	3.54	O
4. I help my co-students in cleaning the canals or in conducting clean-up drive in the campus to prevent the spread dengue.	3.85	O
5. I join eco-clubs/organizations that make activities for the conservation, preservation and protection of the environment.	3.77	O
6. I participate in tree-planting activities either subject, organization or school-based.	4.02	O
7. I segregate biodegradable, non-biodegradable and recyclable waste material.	3.49	O

8. I help keep the classroom clean as well as helping in maintaining the cleanliness of the school campus.	3.78	O
9. I help our school in reducing waste materials through recycling	3.79	O
10. I encourage my classmates and friends to update themselves with environmental issues and concerns by attending environmental symposiums/activities in the campus sponsored by organizations or by the institution.	3.76	O
11. I set a positive environmental example for my friends and classmates to follow.	3.96	O
12. I support student candidates who are concerned with answering environmental problems and issues.	3.94	O
13. I write or call/notify student leaders to express my views about environmental problems in school	3.73	O
14. I turn-off the lights, televisions, computers and other electrical appliances when they are not in use.	4.78	A
15. I close faucets and other water passages properly every after use.	4.66	A
Mean of means =	3.95	O

**Legend:** Q.D.- Qualitative Description; A- Always; O-Often

**In the Community.** The freshmen students *often* practice biodiversity conservation measures in the community (Table 8). However, they *always* practice the items on “*I help maintain the cleanliness of our community by participating in activities such as clean-up drives*”; “*I follow the policies of our government towards biodiversity conservation*”; and “*I segregate biodegradable, non-biodegradable and recyclable waste materials*”. According to the students, their respective local governments in their barangay sponsor and conduct environmental projects such as clean-up drive, tree planting and vegetable gardening activities. The biodiversity conservation measures in their barangay are accordingly strictly implemented like the segregation of wastes during the scheduled collection of garbage. They have to follow this policy of their local government or else their garbage will not be collected if not properly segregated. The item that got the lowest mean is “*I feed cats and dogs in the streets*”. According to the students, they do not usually get to see cats and dogs in the streets and when they do they have other concerns to accomplish. They also think that most of us take good care of our own pets.

Table 8. Biodiversity conservation measures of BSU freshmen in the community

<i>In the Community</i>	Mean	QD
1. I join and get involved in tree planting activities.	4.10	O
2. I feed dogs and cats in the street.	3.27	O
3. I help in catching or reporting roaming animals so that they can be taken care of by the proper authorities.	3.60	O
4. I report incidents of illegal logging, collecting endangered plants and hunting animals in the forest and other abusive acts to the authorities.	3.57	O
5. I follow the policies of our government towards biodiversity conservation.	4.23	A
6. I help maintain the cleanliness of our community by participating in activities such as clean-up drives.	4.32	A
7. I help in keeping nearby forests and riversides or seashore clean	3.60	O
8. I encourage the family or other community members to stop using pesticides in farming for it can harm other species of plants and animals.	3.36	O
9. I share information to community members about the importance of conserving biodiversity.	3.67	O
10. I support public awareness activities at all levels about environmental protection and their understanding of their dependence on a healthy environment.	3.60	O
11. I talk to people that I notice doing something that harms the environment in an effort to persuade that person to stop the activity. ( For example, try to talk with a friend into recycling a mineral water bottle instead of throwing them in the trashcan)	3.66	O
12. I avoid purchasing products that have negative impact on the environment.	3.66	O
13. I walk, or ride a bike instead of using a car in order to help protect the environment.	3.81	O
14. I purchase one product over another product because it is packaged in reusable, returnable or recyclable containers or packages	3.81	O
15. I segregate biodegradable, non-biodegradable and recyclable waste materials.	4.20	A
Mean	3.74	O

## CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn based on the results of the study: (1) BSU college freshmen are very much aware on the unifying themes about the environment, hence, they are very adequately equipped with understanding, knowledge and information on the seven environmental core messages- Balance of, Pollution, Stewardship, Finiteness of Resources, Change, Interdependence, Diversity and Stability; (2) BSU college freshmen have not yet fully-developed the necessary knowledge, attitudes and values and application and decision making skills in order to show concern and motivation to respond to present environmental issues and problems. Thus, they are not yet fully equipped to respond to present environmental issues and problems and to face and appropriately address future environmental threats; (3) The college freshmen's very satisfactory literacy level on environmental knowledge, environmental attitudes and environmental application and decision making skills may not be sufficient to motivate them to show positive attitudes and actions towards environmental protection and biodiversity conservation.

The researchers have set the following recommendations from the significant findings of the study: (1) For BSU faculty to integrate environmental education in their lessons in all subject areas; employ innovative strategies in teaching about the environment to acquire mastery of environmental concepts and develop positive attitudes toward the environment; (2) For the departments and colleges to conduct more environment-related extension activities involving BSU students; and (3) For student organizations to tie up with the local government units in the conduct of extension projects that promote biodiversity conservation and protection in various communities; and (4) To intensify the students' participation in environmental activities aimed at conservation, protection and management of the environment through the natural science and social science subjects.

## LITERATURE CITED

- Guzman, R. and Guzman, R.  
2000 Environmental Education for Sustainable Development in the Philippines. Wisdom Advocate Publishing
- Hungerfolk, H. R. and Volk, T. L.  
1990 *Changing learner behavior through environmental education*. Journal of Environmental Education.21(3): 8-21 (Retrieved from [www.fw.msu.edu/outreachextension/hungerford%20and%20volk.htm](http://www.fw.msu.edu/outreachextension/hungerford%20and%20volk.htm) on October 5,



2012)

Napere, R.

2009 *Interaction of the science and health teachers exposure to mass media on environmental concerns, environmental awareness and beliefs about environmental action.* Unpublished Master's Thesis, Bukidnon State University, Malaybalay City

Palmer, J. and Neal, P.

2004 *The Handbook of Environmental Education*, Routledge Publishing

Tawayan, R. C.

2013 *Environmental Literacy and Biodiversity Conservation Practices of High School Students.* Unpublished Master's Thesis, Bukidnon State University Malaybalay City

Valdoz, A.D.

1999 *An environmental Literacy Test for Science and Technology I.* Unpublished Master's Thesis. Bukidnon State College. Malaybalay City