



The effectiveness of experience and nature-based learning activities in enhancing students environmental attitude

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Article published on April 30, 2018

Key words: Environmental attitude, College students, Experienced-based learning activities, Environmental education.

Abstract

This study investigated the effectiveness of experience and nature-based learning activities in enhancing college students' environmental attitude. It employed pre-test-post-test experimental research design. The participants were the class of fifty-three college students of a higher education institution in Region 2, Philippines. Seven learning activities were employed by the researcher namely pamphlets making, environmental-themed movie poster making, collage making, miniature plant exhibit, vegetable gardening, community clean-up service, recycled art crafts making, and tree planting drive. In like manner, the pre-attitude score and post-attitude scores in the standardize environmental attitude inventory test were compared and the significant differences were determined using paired sample t-test. Results of the study revealed that the different experience-based learning activities were generally rated interesting. Moreover, it was also revealed that the different learning activities significantly increased the environmental attitude of the students towards nature enjoyment, support for interventions and conservation policies environmental movement activism, conservation motivated by anthropocentric concern, confidence in science and technology, environmental threat, altering nature, personal conservation behavior, human dominance over nature, human utilization of nature, and ecocentric concern. This implies that allowing students to be exposed to the different environmental learning activities where direct learning experience is involved significantly increased students environmental construct.

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Introduction

Education for environmental citizenship has become a fundamental dimension in the curricular organization of any educational community. Undoubtedly, moving towards the construction of an environmental citizenship requires a regulatory framework and educational practices that will make this possible (Rios *et al*, 2017).

Curriculum initiatives which will eventually transform students as the vanguard of the environment towards development and sustainable future are the need of 21st-century education. With the present ecological crises being experienced globally, these are not just the tasks assigned to environmentalists, but it generally involves everyone and people must develop a sympathetic attitude towards diversity and sustainability or resources on earth for the survival and stability of life.

The role of educational institutions in developing positive attitudes towards the environment is an indispensable. Keles (2017) affirms that educational institutions should take leadership in the process of building knowledge, skills, awareness, values and sustainable action to achieve the goal of the sustainable earth in order to make the leaders of future generations' conscious and critical thinkers about environmental sustainability. Since most of the theories and applications are predominantly learned at school, the need for learning activities which enhance the environmental attitude of students ensures functional environmental application and significance.

Educational institutions need to increase their efforts to educate their students for a sustainable future (Nasa, 2010). The students at the center of education effort should be provided with the adequate learning experience to become active participants for environment protection. According to Jokinen (2016), these young people are one of the most promising sectors of the society. They can be promoters of change, young as they are because of their natural dynamism and willpower, they can bring the fresh perspective, energy, drive and a sense of what is possible.

Hence, college students in the university, when being educated and informed have greater opportunity to be involved and take part in addressing environmental concerns. The specific objectives of environmental education can be attained in terms of learners' awareness, knowledge, value, attitude and skills, and participation in the resolution of environmental problems, issues, and concerns. Hence, the learners must consider the environment in its totality- natural and built, technological, social, economic, political, cultural, historical, moral, and aesthetic (Lee & Lee, 2008).

Palmer & Neal (1994) noted that the ultimate objective of environmental education is to encourage actions towards the resolution of environmental problems. If environmental education is meant to help students learn and care for the environment, then those responsible for implementing these aims (e.g. teachers) must know the forms of learning experience that encourage and produce active and informed minds. As an identified way to improve students' environmental behavior in the classroom, the need to employ experience-based teaching strategies is needed. Experience-based learning assumes that learning is based on the engagement and experience of the students where the key element is to observe, analyze and reflect on the real learning environment. This learning has been proven effective in enhancing the environmental attitude of students. Previous studies conducted by Ballantyne *et al* (2002) confirm that learning experiences in the natural environment are extremely important in developing students' environmental knowledge, attitudes, and responsible actions. In like manner, Bradley *et al*. (1999) and Aydin (2010) state that student participation in environmental programs will make their increased responsibilities of the environmental behavior and think about environmental issues. Consequently, the positive relationship between environmental awareness and attitude has been empirically investigated by numerous researchers. Pe'er *et al*. (2007) stated that there is a positive relationship between students' environmental knowledge and attitudes towards the environment.

Further affirmed by Magulod (2017) found out that there is a significant relationship between environmental awareness and attitude of college students.

It can be synthesized from previously conducted researches that environmental attitude proves that knowledge and awareness about environment predict the pro-environment behavior of people across gender, education level, and cultures but there were few studies have been empirically conducted to assess learning strategies which promote environmental attitudes. This study aims to provide pedagogical models which can help facilitate the better learning experience for students to enhance their environmental attitude. Hence, this study investigated the effectiveness of experience-based learning activities in enhancing college students' environmental attitude.

Materials and Methods

Method of Research

The researcher employed one-shot-pre-test-post-test experimental research design to assess the effectiveness of experiential learning activities on the environmental attitude of the students. It involved the comparison of the environmental pre-attitude mean score and post-attitude mean-score of the respondents. The students were exposed to the different experience-based learning activities and their attitude scores were gathered and measured before and after the exposure of the students to the different learning activities.

Research Participants

The participants of the study were the fifty-three students of one section enrolled in National Service Training Program (NSTP) under the component of Civic Welfare Training Service (CWTS) where the researcher was assigned to teach the subject.

Instruments

The study used the environmental attitude inventory (EAI) by Milfont & Duckitt (2010) consisted of twelve scales namely: enjoyment of nature, support for interventions conservation policies, environment movement activism, conservation motivated by anthropocentric concern, confidence in science and

technology, environment threat, altering nature, personal conservation behavior, human dominance over nature, human utilization of nature, ecocentric concern, and support for population growth policies. The standardized research instrument consisted of ten items per sub-scale. A Likert scale of 1 as the lowest and 5 as the highest was adopted.

In like manner, a questionnaire checklist made by the researcher was also used to assess the level of interest of the respondents on the use of the different experiential and nature-based learning activities. The instrument-checklist consisted of the seven strategies used by the researcher in teaching. Likert Scale with 1 as to lowest and 5 as the highest was also used as the response indicator of the checklist.

Data Gathering Procedure

The experimental procedure of the study lasted for eight Saturdays. Upon the written permission of the researcher to the concerned authorities. As an ethical consideration of the study, the respondents were oriented about the purpose of data gathering and they were asked to participate. Their participation was voluntary. Gathering of data was conducted before and after the final examination of the respondents to their subject National Service Training Program (NSTP). Fig. 1 shows the paradigm of the study.

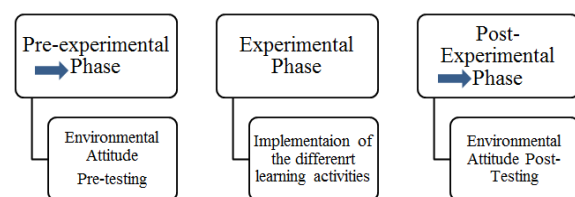


Fig. 1. Treatment Phases of the Study.

The pre-experimental phase was the orientation on the activities and guidelines to be conducted with the topic environmental education. The students were requested to answer the environment attitude inventory questionnaire for their pre-attitude assessment. Planning and scheduling of the different activities were conducted. For the experimental phase, the researcher employed the different experiential-based learning activities in which the

students participated very well. Finally, for the post-experimental phase, after the exposure of the students with the different learning activities, they were asked to answer the environment attitude inventory questionnaire for their post-attitude assessment. They also answered the survey checklist to assess their level of interest in the different experience-based learning activities.

Data Analysis

The descriptive data analysis tool was used to present the assessment of the respondents. The weighted mean was utilized to determine the learning activities perceived by the respondents very interesting. Meanwhile, dependent sample t-test was used to identify the significant difference on the pre-attitude and post-attitude of the respondents. To interpret the level of interest and attitude of the respondents, the scale of interpretation followed this range: 4.20-5.00 (very high/very interesting); 3.40-4.19 (high/interesting); 2.60-3.39 (moderate/neutral); 1.8-2.59

(not interesting/low); 1.0-1.79 (very uninteresting/very low). All the hypotheses of the study were rejected at 0.05 level of significance.

Results and discussion

Students' Level of interest in the different environmental-based learning activities

Consistent with the objectives of the study, Table 1 presents the respondents level of interest on the different environmental-based learning activities. Based on the gathered data, the respondents generally assessed themselves to have a high level of interest as evidence with the grand mean of 4.12 (high). The finding implies that students manifested greater environmental learning interest through experience-based approach. Experience-based learning is the acquisition of knowledge, experience, attitude, and skills derived from one's own experience (Matsuo *et al*, 2008). Teaching environment concepts and awareness become better when it is experience-based.

Table 1. Level of Interest of the students on the different environmental-based leaning activities.

Experiential Learning Activities	Mean	SD	Verbal Interpretation
Pamphlets making	3.89	0.64	Interesting
Movie poster making	4.70	0.46	Very Interesting
Collage making	3.49	0.67	Interesting
Miniature Plant Exhibit	3.91	0.40	Interesting
Vegetable gardening	4.11	0.67	Interesting
Community Clean Up	4.02	0.84	Interesting
Art Crafts making from recycled wastes	3.83	0.83	Interesting
Tree planting Drive	4.74	0.45	Very Interesting
Grand Mean	4.12		High

4.20-5.00 (Very Interesting); 3.40-4.19 (Interesting); 2.60-3.39 (Neutral); 1.8-2.59 (Not interesting); 1.0-1.79 (Very uninteresting).

The assessment of the respondents suggests that the use of the different environmental-based learning activities allowed the respondents to exhibit a high level of interest and motivation. It can also be specifically observed that movie poster making activity (4.70, SD= 0.46) and tree planting drive (4.74, SD=0.45) were assessed by the respondents very interesting activities to engage with. Meanwhile, pamphlets making (3.39, SD=0.64), community clean up (4.02, SD= 0.84), vegetable gardening (4.11, SD=0.67), miniature plant exhibit (3.91, SD=0.40), art crafts making from recycled materials (3.83, SD=0.83). and collage making (3.49, SD=0.67) were assessed by the respondents interesting.



Fig. 1. Movie poster making activity.

A closer inspection of the table shows that the students perceived movie poster making activity (Fig 1) very interesting with the highest mean of 4.70 among the environmental-based learning activities. This suggests that the use of this activity stimulated positive effect on the behavior of the students. The students were asked to illustrate the effects of environmental issues such as black magnetite mining, illegal logging, destruction of coral reefs and pollution by way of designing movie posters. The students pretended to be filmmakers. They invented titles for their movie posters and they were asked to be the actors. The activity becomes good since it forced the students to research on the different environmental issues and their effects on biodiversity. It also allowed the students to use their visual imagination about the possible effects of these environmental issues if not addressed. The activity captured the interest of the students to manifest environmental concern.

This finding further suggests that the use of movie-inspired learning activity can enhance students' level of environmental concern. Mishan (2004) noted that movies can be considered as authentic material and they provide the learners with genuine input. Katchen (2003) also affirmed that movies can also arouse feelings and opinions and create discussion. Thus, using film-inspired activities in the classroom as authentic material requires an emphasis on the teaching approach, which should be content- and task-based.



Fig. 2. Tree Planting Activity.

Tree planting activity (Fig. 2) as environmental learning activity was assessed very interesting with the mean of 4.74. This indicates that the students considered tree planting drive as a purposeful activity to preserve the environment. Tree planting initiative has been considered as a mitigating factor for climate change and other environmental issues. The students were required to have tree planting activity as part of their requirements in civic welfare training service. This allowed the students to realize better about the role of trees in greening landscapes, cleaning the air and reducing energy use. McPherson & Rowntree (1993) noted that there has been a growing interest towards having a greener environment through tree planting campaign efforts globally, as trees are purported to provide many benefits such as temperature modification and energy conservation. Concomitantly, Tyrvaainen *et al.* (2005) affirmed that trees are an abatement of air and water pollution.



Fig. 3. Leaflets making activity.

Leaflet making activity (Fig 2) was also assessed by the students with the mean of 3.89 interpreted to have an interesting attribute. The pamphlet making activity allowed the students to design leaflets containing environmental information with colored photographs, color-coded heading, and other visual features.

The activity provided the students the opportunity to design their own leaflets bearing the information about environmental education, solid waste management, and disaster risk reduction management. Young & Witter (2010) found out that brochures and pamphlets were effective in enhancing participants' knowledge about environmental problems.

Brochures rated high in communication effectiveness were useful in increasing environmental knowledge.

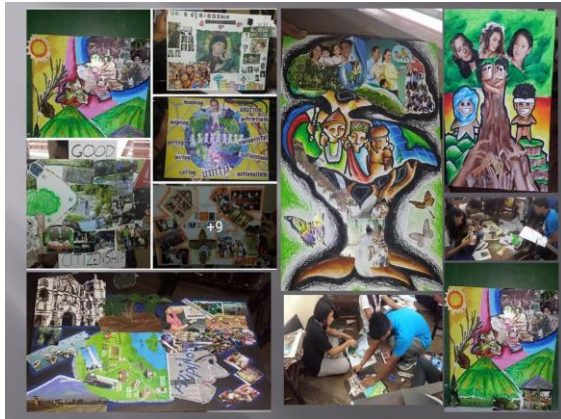


Fig. 4. Collage making activity.

College making activity (Fig 3) obtained the mean of 3.49 which was assessed by the students interesting. The activity enhanced the interest of the students through group learning activity to illustrate their role as the youth as vanguards of the environment for sustainability. The students were asked to create an art by sticking various materials depicting their role in the environment. This learning activity promotes interdisciplinary understanding of nature and built environment through humanities and arts. This paves the way to use art as a model of acquiring and interpreting knowledge of the environment enhancing the creativity and artistry of the students.

According to Jacobson *et al* (2007), there were few integrative practices from the arts and humanities to help students understand the broader context of individual and collective actions regarding the environment. Likewise, Miles (2010) speculated that contemporary art dealing with climate change and environmental issues have the capacity to contribute to a shift in consciousness and likely to be conducive to a more sustainable way of living. Miniature plants exhibit (Fig 4) also obtained the mean of 3.91 described as an interesting learning activity. This allowed the students to create a scene in nature and a miniature of the ecosystem. The activity motivated the students to study the characteristics of plants, the process how the plants perform photosynthesis, and the proper way of taking of plants.



Fig. 5. Miniature plants exhibit as art-by-nature activity.

The artistic and aesthetic vision about the environment influences seriously what the students think, feel and do about the environment. Hence, the use of arts is considered an important factor in promoting deeper awareness and attitudes of students towards the environment. Hence, the integration of environment art education plays a prominent role in greening the environment.



Fig. 6. Horticulture activity.

Another interesting learning activity is horticulture activity which was assessed with the mean of 4.11. The students were engaged by practicing cultivation and management of vegetables in their community service area. Horticultural practices are increasingly being used to improve environmental attitudes towards specific environmental issues in the school curriculum.

Karsch & Kathryn (2003) found out that there is a significant increase in the environmental awareness and attitudes of students when engaged in gardening.

She further noted that horticulture as a possible solution to engaging students in science education because of its more activity-based approach. In like manner, Waliczek & Zajicek (1999) concluded in their study that participation in garden activities results in students gaining more positive attitudes about environmental issues.



Fig. 6. Community clean-up service.

Further, community cleaning service assessed by the students with the mean of 4.02 interpreted as an interesting activity. The students were able to experience cleaning sidewalks and roads. This allowed the students to become directly involved in environmental health and sanitation. They were responsible for segregating biodegradable and degradable wastes with proper disposal. Such activity provided the students to develop a more positive environmental attitude. Markus *et al* (1993) concluded that integrating service learning through students' participation in community service with classroom instruction can have a significant effect on their personal values and orientations towards the community. In like manner, Schultz *et al* (2005) found out that the involvement of students in civics club and their understanding of environmental concepts showed that students' performance very well in the knowledge test.

Finally, art crafts making from recycled wastes assessed by the respondents with the mean of 3.83 which is interesting. The activity allowed the creativity of students to turn recycled wastes materials into a Christmas lantern and recycled dolls.

Such learning activity promoted the students to practice and internalize the three R's (reduce, reuse, and recycle) with the appeal of making arts and crafts. According to Rosenthal (2003) environmental art-making can address contemporary environmental and social issues, can promote system thinking by recognizing interconnections and complexity. Concomitantly, Jacobson *et al* (2007) also noted that the integration of science and arts is important yet being ignored strategy for effective resource management and communication.



Fig. 7. Art crafts making from recycled wastes.

Test of Difference on the pre- and post-environmental attitude scores of the students exposed to the different experience-based learning activities

The pre and post-attitude inventory test was administered in order to determine the significant change in the environmental attitudes of the students after employing the use of different experience and nature-based environmental learning activities.

The tables reveal the comparison of the environmental attitude of the respondents along with the twelve sub-scales of environmental attitude namely attitude of the students towards nature enjoyment, support for interventions and conservation policies environmental movement activism, conservation motivated by anthropocentric concern, confidence in science and technology, environmental threat, altering nature, personal conservation behavior, human dominance over nature, human utilization of nature, and ecocentric

concern activities exposed to the different environmental learning activities before and after the study. Hence, the null hypotheses of the study were rejected.

Table 2. The Difference between the Pre and post-Attitude scores towards nature enjoyment.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	2.81	0.52	-	52	-	0.00
Post	4.08	0.78	1.264		13.46	0**

**= significant at 0.01 level.

Table 2 shows the comparison on the nature enjoyment attitude of the respondents exposed to the different learning activities before and after the study. The students had a pre-attitude score of 2.81 (moderate) and a post-attitude score of 4.08 (high) with the (t-ratio=-13.46) and (p value=0.000). Thus, there is a significant difference between the attitude of the students before and after the treatment of the study where the respondents developed a high positive attitude towards nature enjoyment. The increased attitude means score indicates that the students manifest higher enjoyment in nature and other natural settings.

Table 3. The Difference between the Pre and post-Attitude scores towards support for interventions and conservation policies.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.55	0.93	-	52	-	0.000**
Post	4.15	0.93	-0.603		-3.528	0.000**

**= significant at 0.01 level.

Table 3 presents that the students had a pre-attitude score of 3.55 (High) and a post-attitude score of 4.15 (high) with the (t-ratio=-3.528) and (p value=0.000) indicating that there is an increased on the attitude of the students before and after the treatment of the study on their support for interventionist conservation policies. The finding suggests that the students showed a higher positive attitude of practicing 3R's, conserve energy, adopt the more conserving lifestyle, and become more oriented on the existing policies and laws governing environmental protection.

Table 4. The Difference between the Pre and post-Attitude scores towards Environmental Movement Activism.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.06	1.12	0.88	-	-	0.000**
Post	3.87	0.88		0.811	4.022	

**= significant at 0.01 level.

A closer look at Table 4, it reveals that the students had a pre-attitude score of 3.06 (moderate) and a post-attitude score of 3.87 (high) with the (-0.811) and (p value=0.000) indicating that there is an increased on the attitude of the students before and after the treatment of the study towards support for environmental movement activism. This suggests that the students exhibited a higher level of personal readiness to actively support an organized action for environmental protection. Their willingness to extend support for environmentalist cause was enhanced through the use of different environmental learning activities.

Table 5. The Difference between the Pre and post-Attitude scores towards Conservation Motivated by Anthropocentric Concern.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	2.45	1.10	-	52	-	0.000**
Post	4.58	0.50	2.132		13.370	0.000**

**= significant at 0.01 level.

Meanwhile, Table 5 presents that the students had a pre-attitude score of 2.45 (Low) and a post-attitude score of 4.58 (Very High) with the t ratio of (-13.370) and (p value=0.000) indicating that there a significant high increased on the attitude of the students towards conservation motivated by anthropocentric concern before and after the treatment of the study. The finding suggests that the students showed a very high positive attitude on practicing 3R's, conserve energy, adopt the more conserving lifestyle, and become more oriented on the existing policies and laws governing environmental protection.

Table 6. The Difference between the Pre and post-Attitude scores towards Confidence in Science and Technology.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.30	1.08	-0.566	52	-3.114	0.002 *
Post	3.87	0.68				

**= significant at 0.01 level.

In like manner, Table 6 reveals the pre-attitude score of 3.30 (moderate) and a post-attitude score of 3.87 (high) with t-ratior of (-3.114) and (p-value of 0.002). The finding suggests that after the engagement of the students on the different environmental learning activities, they showed a high attitude level towards confidence in science and technology as tools to solve environmental problems. They manifested higher belief that technology can avert or repair damage or harm to the environment.

Table 7. The Difference between the Pre and post-Attitude scores towards Environmental Threat.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.25	1.16	-1.037	52	-3.531	0.000**
Post	4.28	1.26				

**= significant at 0.01 level.

Meanwhile, Table 7 shows that the comparison of the pre-attitude and post-attitude scores of the respondents exposed to the different learning activities before and after the study. The students had a pre-attitude score of 3.25 (moderate) and a post-attitude score of 4.28 (High) with the (t-ratio=-3.531) and (p value=0.000).The increased post-attitude score of the respondents indicates that the students attained high belief and attitude on the fragility of the environment that all serious damages done to the environment could soon have catastrophic consequences for both nature and humans. They exhibited higher belief that if things which can destroy the environment will still be persistently done, a major ecological catastrophe will be experienced in the future.

Table 8. The Difference between the Pre and post-Attitude scores towards altering nature.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.18	0.899	-0.773	52	-5.670	0.000**
Post	3.96	0.919				

**= significant at 0.01 level.

Table 8 presents that the students had a pre-attitude score of 3.18 (moderate) and a post-attitude score of 3.96 (high) with the (t-ratio=-5.670) and (p value=0.000) indicating that there is an increase on the attitude of the students before and after the treatment of the study towards altering the nature.

The finding means that the students showed a high level of attitude towards promoting actions which can help preserve the environment in its original and pristine state and should not be altered in any way by human activity or intervention.

Table 9. The Difference between the Pre and post-Attitude scores towards personal conservation behavior.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.00	0.70	-1.396	52	-11.785	0.000**
Post	4.39	0.66				

**= significant at 0.01 levelns= not significant.

Table 9 clearly presents that the students had a pre-attitude score of 3.00 (moderate) and a post-attitude score of 4.39 (Very High) with the (t ratio= -11.785) and (p-value of 0.000). This suggests that there is a significant difference on the pre-attitude mean and post-attitude mean of the respondents before and after the conduct of the study. The finding implies that the students attained a very high level of attitude towards personal conservation behavior after their exposure to the different environmental learning activities. This suggests that the students were able to show a positive attitude towards taking care to conserve resources and protect the environment in their personal everyday behavior.

Table 10. The Difference between the Pre and post-Attitude scores towards human dominance over nature.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.62	0.68	-	52	-	0.003
Post	3.84	0.69	0.226		3.040	*

**= significant at 0.01 levelns= not significant.

Subsequently, Table10 shows the pre-attitude score of the students is 3.64 (high) and post-attitude of 3.84 (high) with the computed (t ratio= -3.040) and (p-value of 0.000) indicates significant difference before and after the exposure to the different learning activities. This means that the students manifested a high level of attitude towards the idea that nature exists primarily for human use, hence they were able to realize that humans and nature have the same rights where humans should.

Table 11. The Difference between the Pre and post-Attitude scores towards human utilization of nature.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.00	0.588	-0.90	52	-6.68	0.000*
Post	3.90	1.02				

**= significant at 0.01 level ns= not significant.

In like manner, Table 11 presents that the respondents have a pre-attitude score of 3.00 (moderate) and a post-attitude score of 3.90 (high) with the computed (t ratio= 0.6688) and (p value= 0.000) showed significant difference before and after their exposure with the different learning activities. This suggests that students manifested higher attitude on the idea that environmental protection should be given priority rather than economic and development growth.

Table 12. The Difference between the Pre and post-Attitude scores towards ecocentric concern.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	3.32	0.82	-	52	-	0.000
Post	3.98	0.30	0.660		6.139	

**= significant at 0.01 level ns= not significant

Table 12 shows that there is a significant difference on the pre-attitude score of 3.32 (moderate) and the post-attitude score of 3.98 (high) with the computed (p value= 0.00) revealing that the students obtained a high level of attitude towards ecocentric concern after their exposure to the different learning activities.

The finding suggests that the students showed a high level of concern when they see natural environments being destroyed particularly when forests are being cleared for agricultural and residential purposes.

Table 13. The Difference between the Pre and post-Attitude scores towards support for population growth policies.

Attitude	Mean	S.D.	Diff.	df	t-ratio	P-value
Pre	2.62	0.98	-	52	-	0.80
Post	2.66	0.67	0.0377		0.247	ns

**= significant at 0.01 level ns= not significant.

Lastly, Table 13 presents that there is no significant difference on the pre-attitude and post-attitude mean scores of the respondents towards support for population growth policies. The pre-attitude mean score of 2.62 (moderate) and post-attitude mean score 2.66 (moderate) showed no significant difference. This means that the students have still a moderate level of attitude towards supporting policies which regulate population growth before and after their exposure to the different learning activities.

The study generally revealed that with the exposure of the students to the different environment and experience-based learning activities, it significantly increased their level of environmental attitude. The finding of the present study can be confirmed by Ballantyne & Packer (2002) that learning in natural environments is attractive to students and has an important impact on their attitudes towards the environment, their desire to look after the environment, their behavior in natural areas and their household environmental practices. They further concluded that combining teaching instruction with observation is a powerful teaching strategy, especially when it allows students to understand the impact of human activities on wildlife and natural habitats. In like manner, In the study of Coertjens *et al* (2010) found out that schools in which science is taught in a more hands-on manner are associated with higher student environmental awareness whilst environmental learning activities are associated with more pro-environmental attitudes among students.

Conclusion

Based on the findings of the study, it is concluded that the use of the different environmental-based learning activities allowed the respondents to exhibit a high level of learning interest. Tree planting drive and environmental movie poster making were very interesting learning activities while pamphlets making, community clean-up, vegetable gardening, miniature plant exhibit, art crafts making from recycled materials and environmental collage making were assessed as interesting learning activities by the respondents.

In like manner, the study also found out that the use of the different environmental-based learning activities significantly resulted to the increased level of students' environmental attitude towards nature enjoyment, support for interventions and conservation policies environmental movement activism, conservation motivated by anthropocentric concern, confidence in science and technology, environmental threat, altering nature, personal conservation behavior, human dominance over nature, human utilization of nature, and ecocentric concern.

This implies that allowing students to be exposed to the different environmental learning activities where direct learning experience is involved significantly increased students environmental construct.

Recommendations

Based on the findings of the study, the following recommendations were drawn: (1) experience and nature-based learning activities significantly resulted in the students' increased level of environmental attitude, hence maximum utilization of these leaning activities should be initiated to supplement environmental-based lessons; (2) teachers should be encouraged to develop and design more experienced-based learning activities to teach environmental education to increase students' environmental attitude; (3) to further strengthen the involvement of students in environmental protection campaign and advocacy, the university may encourage and empower student organizations to align their goals for the environmental preservation and conservation; (4) a replication of the study with bigger number of respondents and more nature-based activities should be conducted with longer duration of students' exposure.

In consonance with the above recommendations, the implications of the study to curriculum development are to allow higher education institutions conduct curriculum reviews by vertically and horizontally integrating environmental themes and concepts to the different related courses. Faculty members may be encouraged to reflect on the redefinition of the teaching methods to experience-based approaches incorporating environmental concepts and values.

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