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Climate change awareness and environmental attitude of College students in one campus of a State University in the Philippines

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Abstract

Climate change is one of the major concerns of the world in the 21st century. The quality of the earth's environment is dependent on the students because they are the future leaders and most qualified individuals in protecting the environment. The study assessed the climate change awareness and the environmental attitude of undergraduate students of Cagayan State University at Lasam, Philippines. It employed descriptive correlational research design. The participants of the study were the 180 undergraduate students (n=180) randomly sampled from the three college departments of CSU-Lasam. Descriptive statistics such as mean and percentage were used while inferential statistics such as independent sample t-test, one way ANOVA and Pearson r were used to analyze the data gathered from the respondents using two sets of standard survey questionnaire. Hypotheses of the study were rejected at 0.1 and 0.5 levels of significance. Results of the study revealed that the respondents have high level of climate change awareness and environmental attitude. It was confirmed in the study that awareness of the students on climate change differ significantly along gender, age, birth order, and parents' educational attainment. Meanwhile, attitude of the respondents towards the environment differ along with their age and college departments. The study also found out that there is a significant relationship between climate change awareness and environmental attitude of the respondents. Suggesting that the higher awareness the students on climate change, the higher environmental attitude they exhibit. Hence, by providing knowledge to students about climate change, the higher they demonstrate positive attitude towards environmental care is expected. Results of the study will serve as basis in initiating campus-based environmental awareness campaign.

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Introduction

Climate change already caused devastating events in the world today. This is not only a concern to single individual but an environmental issue in which everyone should be aware of particularly on human related activities which significantly impact the earth's environmental degradation and its biodiversity. According to Parry, Rozenzweig, Iglesias, & Fischer (1999) climate change has become one of the most serious environmental problems faced in the 21st century threatening public health and food security. Evidences of climate change are already present across the world particularly global warming, increase of sea levels, temperature and other related diseases, plant vegetation destruction and occurrence of other forms of calamities.

The Philippines, like many of the world's poor countries, is vulnerable to the impacts of climate change because of its limited resources (Jose & Cruz, 1999). Hence, public awareness on the negative effects of climate change among Filipinos is vital since it leads to collective action for prevention and adaptation. Ekpho & Ekpho (2011) stressed that climate change specialists have reiterated that a solution to climate change problems will require climate change awareness and its proper understanding.

Keles (2017) opined that educational institutions should take leadership in the process of building knowledge, skills, awareness, values and sustainable action to achieve the goal of sustainable earth in order to make the leaders of future generations conscious and critical thinkers about environmental sustainability. There is a strong need to capture greater understanding of the awareness of climate change in order for universities to initiate curriculum update and interventions particularly to the internal and external stakeholders of the academic community. Hence, climate change education is seen as a valuable tool in increase climate change awareness and adaptive capacity in society broadly (UNFCCC, 2012).

Among the previous studies relating to climate change awareness were conducted, Ochieng & Koske (2013) investigated on the climate change awareness and perceptions among primary school teachers found out that their level of climate change awareness is not significantly low but there are significant gaps in their knowledge which needs to be addressed. In like manner, Skalik (2015) investigated on the climate change awareness and the attitudes of adolescents in the Czech Republic found the significant relationship between the two variables. A close relationship between the amount of information accessed and students' evaluation on the seriousness of climate change was found. The students' trust on scientific evidence and their efforts not to rely only on one source on information correlate with their awareness. Corollary to this, Tabago (2016) assessed the climate change attitude of students found out that they have high perception and attitude on climate change and confirmed that perception about climate change results into an attitude towards helping reduce factors causing climate change.

It can be synthesized from the previous results of literature that there is an evidence of significant relationship between the climate change awareness and environmental attitude of the students but findings were limited to the general relationship. This necessitates the need to further investigate the specific factors and predictors of climate change awareness that could clearly relate to the different aspects of students' environmental attitude in which this present study aims to explore in the Philippine context. Before integrating school programs relating to climate change awareness, it is paramount to assess students' level of climate change awareness and perceptions since this will likely influence their attitude on how they will participate to the activities.

This study generally aims to assess the level of awareness of college students towards climate change and their environmental attitude. Specifically, (1) determine the students extent of awareness on climate change; (2) determine the students' extent of environmental attitude; (3) ascertain the significant differences on the climate change awareness, environmental attitude and ecological behavior when grouped according to the profile variables of the respondents.

Finally, (4) test the significant relationship between the respondents' attitude and behavior on climate change awareness.

This study hopes to bring significant advocacy to encourage college students in acting positively towards managing the impact of climate change. Since no study has been conducted investigating the climate change awareness and environmental attitude of students of Cagayan State University at Lasam, Philippines. This study aims to guide higher educational institutions (HEIs) in the Philippines to integrate environmental issues in their curriculum development which will gear towards the development of well informed and environmentally sensitive professionals of the 21st century.

Materials and methods

Method of Research

This study employed descriptive correlational research design. The data used in this study came from a survey of 180 undergraduate students of Cagayan State University at Lasam. The respondents were randomly sampled from the three college departments specifically the College of Teacher Education (CTE), College of Technology (COT) and College of Information and Computing Sciences (CICS). Inform consent was employed as the ethical consideration of the study. Permission was sought from the concerned offices before the conduct of the study.

Instruments

This study used a three-part survey questionnaire. Part I elicited the personal characteristics of the respondents as to their gender, age, year level, college departments, type of High school graduated from, family monthly income, birth order, parents' educational attainment and occupation. Part III measured the level of environmental awareness of the respondents adopted from Car (2015) with five sub-scales namely (1) awareness on changing weather and climate, (2) awareness on the causes of climate change, (3) awareness on the effects of climate change, and (4) awareness on the methods of migration and adaptation to climate change. Part II assessed the environmental attitude of the respondents which was developed by Ugulu, Sahin & Baslar (2013) consisted of four subscales namely (1) environmental awareness, (2) attitudes towards recovery, (3) attitudes towards recycling, (4) environmental consciousness and behavior. The respondents answered on a five-point Likert scale with 1 as the lowest and 5 as the highest.

Data Analyses

To analyze the data gathered, descriptive statistics such as mean, standard deviation and rank were used. Inferential statistics such as independent sample t-test and one-way ANOVA were utilized to find out the significant difference among the climate change awareness and environmental attitude of the respondents when grouped according to their profile variables. Pearson product moment correlation was used to ascertain the significant relationship between climate change awareness and environmental attitude. The scale of interpretation followed this range: 4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Uncertain); 1.8-2.59 (Low); 1.0-1.79 (Very Low).

Results and discussion

Climate Change Awareness of the Students

Table 1 shows the students' level of climate change awareness. It can be clearly seen from the table that the respondents have a "high" level of awareness on climate with a grand mean of 3.72. This generally implies that the students of Cagayan State University at Lasam manifested a high level of climate change awareness. It can be specifically observed that they have "high" rating along the five sub-scales namely a) awareness on weather and climate with a mean of 3.65 (high); b) awareness on the causes of climate change with a mean of 3.96 (high); c) awareness on the effects of climate change with a mean of 3.67 (high); and d) awareness on the methods of mitigation and adaptation to climate change with a mean of 3.67 (high).

Awareness on the causes of climate change registered with highest mean of 3.96 and standard deviation of 0.58 obtained first rank among the sub-scales. This finding indicates that the students assessed themselves to have high level of awareness on the different causes of climate change.

They highly favored that burning fossil fuels, cutting down trees, improperly manner of disposing garbage waste were the identified human activities instigating climate change while volcanic eruptions were highly identified as natural cause of climate change. A closer inspection of the table, awareness on the methods of mitigation and adaption on climate change was rated with the mean of 3.67 and standard deviation of 0.84 obtained the second highest mean. This indicates that the students are highly aware on the different activities may be done to mitigate the effects of climate change such as planting trees, growing more organic fruit and vegetables, purchase of more local products, and using and renewable sources of energy. Meanwhile, awareness on the changing climate was rated with the mean of 3.65 and standard deviation of 0.56 obtaining the third rank. This finding explains that the students possessed knowledge and basic concepts about climate change. They can significantly recognize that climate change is the process of changing of climate and weather from year to year.

Table 1. Students' Level of Climate Change Awareness (n=180).

Climate Change Awareness Sub-scales	Mean	SD	Verbal Interpretation	Rank
Awareness on Changing Weather and Climate	3.65	0.56	High	3
Awareness on Causes of Climate Change	3.96	0.58	High	1
Awareness on the Effects of Climate Change	3.60	0.76	High	4
Awareness on the Methods of mitigation and adaptation to climate change	3.67	0.84	High	2
Grand Mean	3.72		High	

4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Uncertain); 1.8-2.59 (Low); 1.0-1.79 (Very Low).

Awareness on the effects of climate change was assessed with a mean of 3.60 and standard deviation of 0.76 ranked last among the sub-scales. The respondents showed consciousness that climate change can cause flooding and droughts, sea levels to rise, increase in temperature and acidity of oceans, melting ice caps, and spread of climate-related diseases but needs further enhancement.

The above findings of the study on the climate change awareness of the respondents generally imply that they show knowledge towards the causes, effects, and methods of mitigating climate change which could be a good point for the university to further strengthen and enhanced their climate change adaptive capacity through educational programs. According to Pruneau, Liboiron, Vrain, Gravel, Bourque & Langis (2001) climate change is an issue which affects all parts of life and requires education to be considered as a whole without the boundaries of discipline.

Environmental Attitude of the Students

As seen in table 2, the students' level of environmental attitude was generally rated with the gran mean of 3.86 described as high. This generally means that the students have a positive attitude towards the environment. It can be clearly gleaned from the data that the students rated themselves to have positive attitude on the four sub-scales to wit, environmental awareness with the mean of 3.58 (high), attitudes toward recovery with a mean of 4.16 (high), attitudes towards recycling with the man of 3.91 (high), and lastly environmental consciousness and behavior with the mean of 3.84 (high).

Table 2. Students' Level of Environmental Attitude (n=180)

Environmental Attitude Sub-scales	Mean	SD	Verbal Interpretation	Rank
Environmental Awareness	3.58	0.75	High	4
Attitudes towards recovery	4.16	0.71	High	1
Attitude towards recycling	3.91	0.85	High	2
Environmental consciousness and behavior	3.84	0.83	High	3
Grand Mean	3.86		High	

4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Uncertain); 1.8-2.59 (Low); 1.0-1.79 (Very Low).

Perusing the data, it shows that attitudes towards recovery were rated by the respondents with the highest mean of 4.16 and standard deviation of 0.71 registered first rank. The finding implies that respondents manifested highly positive attitude towards using rechargeable batteries, recycling of old clothes and newspapers, and observing principles of conservation and recovery.

In like manner, environmental consciousness and behavior was rated with a mean of 3.84 with standard deviation of 0.83 occupying second rank among the sub-scales. This finding reveals that the students have a high favorable attitude towards working voluntarily for a better environment by participating in environmental activities as well as showing consciousness about environmental matters and issues happening around them. Attitude of students towards recycling was also rated high with the mean of 3.91 and standard deviation of 0.85 ranked third. The result implies that the students manifest a positive attitude towards reusing and recycling materials where proper waste management practices are observed. They tend to show positive recycling behavior.

Lastly, environmental awareness was also rated with the mean of 3.58 and standard deviation of 0.75 registered the last rank among the sub-scales.

The respondents showed a positive attitude towards planting activities, environment cleaning, protection of forest and cultural environment and the environment economy but the students showed minor priority in this sub-scale. Hence, there is a need to further strengthen.

The results presented on the environmental attitude of the students of CSU-Lasam presents course of action for the university to produce environmentally conscious graduates. By identifying what the students know and manifest towards the environment will be the baseline data to point areas for development. Pearson et al (2005) noted that schools are possibly better vehicles for improving environmental awareness as environmental issues are more readily incorporated across school curricula.

Test of Difference on the Climate Change Awareness when grouped according to their personal characteristics

As seen from the table above, it reveals that there is a significant difference on the level of climate change awareness of the students when grouped according to gender, age, residence, birth order, and parents' educational attainment since the computed p-values were less than the alpha level of 0.05 significance, hence the null hypotheses of the study were rejected.

Table 4. Difference on the level of climate change awareness when grouped according to respondents' personal characteristics (n=180).

Profile Variables	Climate Change Awareness	Interpretation
Gender	0.004*	Significant
Age	0.007 *	Significant
Year Level	0.103	Not Significant
College Department	0.051	Not Significant
High school Graduated from	0.456	Not Significant
Family monthly income	0.111	Not Significant
Birth Order	0.035*	Significant
Mother's Educational Attainment	0.034 *	Significant
Father's Educational Attainment	0.023*	Significant
Mother's Occupation	0.130	Not Significant
Father's Occupation	0.130	Not Significant

*= significant at 0.05 level

Result of the t-test showed that female students have higher level of climate change awareness compared to male students. This implies that female students of CSU-Lasam exhibit higher level of awareness compared to male students. The study negates the finding of Tabago (2016) that male and female students have the same degree of perception regarding awareness of the occurrence of climate change. Further, Carlsson-Kanyama (1998) expressed that females are more environmentally concerned than males because biologically, women have a caring nature.

In like manner, it was also revealed that age and birth order spelled differences on the climate change awareness of the respondents. Post Hoc Tukey test revealed that students who belonged to the age brackets of 22-25 have higher level of awareness on climate change compared to those who belonged to the age brackets of 18-21. This finding implies that older students of the university are more aware and active of climate change facts. This finding confirms that older people tend to become more social and more experienced. Hence, they express higher concern about environmental hazards. Further, age and birth order were also considered sources of variation for environmental consciousness (Ozsoy, 2012). Parents' educational attainment showed significant difference on the level of climate change awareness of the respondents. Mothers' education and fathers' education revealed that the respondents whose parents who are college undergraduates and graduates are more aware on climate change compared to those respondents whose parents were elementary and high school graduates and undergraduates. This may be attributed to the fact that when parents are more educated the higher level of environmental concern they exhibit in which their children may have seen and observed. This finding is in consonance with Kahriman- Ozturk et. Al. (2012) that level of schooling plays a significant role in the environmental and climate change awareness. Moreover, profile variables such as year level, college departments, type of high school graduated from, family monthly income, and parents' occupation do not spell significant difference on the climate change awareness of the respondents. This generally means that the respondents have the same level of climate change awareness perception regardless of their year level, department, type of high school graduated from and parents occupation.

Test of Difference on the Environmental Attitude of when grouped according to their personal characteristics

Table 5 also presents the test of difference on the environmental attitude of the respondents when grouped according to their profile variables. The significant differences on the level of environmental attitude of the respondents are seen along with the age and college departments since the computed p values were lesser than 0.01 and 0.05 levels of significance, hence the null hypotheses of the study expressed that there is no significant difference on the environmental attitude of the respondents when grouped according to their profile variables are therefore rejected.

As gleaned from the table, F-test revealed significant difference on age showed that students who belonged to the age brackets of 22-25 have higher environmental attitude compared to those who belonged to the age brackets of 18-21. This finding can be attributed that older students are more committed to their environmental attitude compared to the younger respondents. Further, age was also considered source of variation for environmental awareness (Ozsoy, 2012).

Table 5. Difference on the environmental attitude of respondents when grouped according to their profile variables (n=180).

Profile Variables	Environmental Attitude (p-values)	Interpretation
Gender	0.403	Not significant
Age	0.000 **	Significant
Year Level	0.233	Not significant
College Department	0.002 *	Significant
High school Graduated from	0.374	Not significant
Family monthly income	0.296	Not significant
Birth Order	0.850	Not significant
Mother's Educational Attainment	0.205	Not significant
Father's Educational Attainment	0.787	Not significant
Mother's Occupation	0.193	Not significant
Father's Occupation	0.595	Not significant

*= significant at 0.05 level

**= significant at 0.01 level

Moreover, college departments of the respondents showed significant difference. The data revealed that students who were enrolled to the College of Information and Computing Sciences (CICS) and College of Technology (COT) have higher assessment on environmental attitude compared to the students of the College of Teacher Education (CTE). The study implies that students taking professional disciplines have lower environmental attitude compared to science & technology (S&T) related courses. This finding confirms Tikka *et al.* (2000) that students of professional disciplines had lower environmental knowledge compared from other disciplines since students having technology background believed that technology have capability to solve environmental problems. Further, Xin Ma & Bateson (1999) noted that pure Science and technology (S&T) students had the highest awareness as compared to students from other disciplines. This was because the S&T students were more interrelated to the environment.

Furthermore, the respondents exhibit the same level of environmental attitude regardless of their gender, year level, high school graduated from, family monthly income, birth order, parents educational attainment and parents' occupation.

The non-significant difference on the environmental attitude of the respondents when grouped according to their gender contradicts most of the findings that female students were found to be more sensitive toward environment than male students.

Relationship between climate change awareness and environmental attitude of CSU-Lasam students

Table 6 presents the test of relationship between the climate change awareness and environmental attitude of the respondents. Generally, result of the Pearson r correlation showed that there is a relationship between climate change awareness and environmental attitude of the respondents. The hypothesis of the study states that there is no significant relationship between climate change awareness and environmental attitude is rejected. This implies that climate change awareness is associated to environmental attitude. This finding of the study confirms Hasaan, Rahman, & Abdullaha (2010) that there was a significant relationship between knowledge, awareness, attitudes and practices to the environment. Hence, the integration of knowledge, awareness and attitudes were considered important elements in reshaping the behavior of students towards environmental practices.

Table 6. Relationship between the climate change awareness sub-scales and environmental attitude sub-scales (n=180).

Parameters		Environmental Awareness	Attitudes towards recovery	Attitude towards recycling	Environmental consciousness and behavior
Awareness on Changing Weather and Climate	r	.3320	.0019	.1578	.2137
	P value	p=.001*	p=.986	p=.138	p=.043*
Awareness on the Causes of Climate Change	r	.1031	.1322	.1677	.1102
	P value	p=.334	p=.214	p=.114	p=.301
Awareness on the Effects of Climate Change	r	.3863	.0553	.2715	.2250
	P value	p=.000**	p=.605	p=.010*	p=.033*
Awareness on the Methods of mitigation and adaptation to climate change	r	.4217	.1438	.2445	.3742
	P value	p=.000**	p=.176	p=.020*	p=.000**

**= significant at 0.01 level

ns= not significant at 0.05 level

The significant relationship between climate change awareness and environmental attitude of the respondents is found specifically between the awareness on the changing weather and climate of the respondents indicated by the r value of .3320 at p - value of .001. The positive relationship indicates that the higher the level of awareness of the students on the varying weather conditions they exhibit higher level of environmental awareness. Consequently, awareness of the respondents on changing weather

conditions is also associated to their environmental behavior and consciousness with the r value of .2137 at p value of .043. The positive relationship also showed that the higher level of awareness of the respondents would also mean a higher level of environmental consciousness and behavior. Further, the finding can be clarified that the higher awareness of the students on varying weather conditions the more they behave environmentally conscious. Accordingly, awareness on the effects of climate change is directly associated on the environmental awareness (r=.3863 at p value of .000), attitude towards recycling (r=2715 at p value of .010) and environmental consciousness and behavior. Such relationship can be explained that students who are more aware on the effects of climate change the more they exhibit positive attitude towards environmental concern particularly on the process of recycling and they exhibit more caring attitude towards the environment.

In like manner, awareness on methods, mitigation and adaptation to climate change is significantly related to the environmental awareness (r= .4217 at p value of .000), attitude towards recycling (r=.2445 at p value of .020), and environmental consciousness and behavior (r =.3742 at p value of .000). This significantly implies that the higher level of awareness of the respondents on the mitigating factors of climate change they exhibit higher level of awareness, attitude and consciousness towards the environment.

The significant relationship between climate change awareness and environmental attitude of the students implies that to improve the environmental attitude of thy students they should be provided and equipped with the proper knowledge and awareness on the effects, causes and methods of mitigating climate change. A comprehensive environmental program of the university should be crafted considering the salient points of the present study.

Conclusion

Based on the results of the study, it is concluded that the undergraduate students of Cagayan State University at Lasam have a high level of awareness on climate change and a high level of environmental attitude. This means that the students are willing to perform actions to help reduce the effects of climate change. It was also found out in the study that climate change awareness of the students differed significantly across gender, age, birth order, and parents' educational attainment. Meanwhile, attitude of the respondents towards the environment differed along with their age and college departments. Further, there exist a significant relationship between climate change awareness and environmental attitude of the respondents. Suggesting that the higher awareness the students possess, the higher environmental attitude they exhibit. Hence, by providing knowledge to students about climate change, the higher they demonstrate positive attitude towards environment care.

Based from the conclusion of the study, it is suggested that the university should be proactive in its role to inculcate among its students the proper and adequate knowledge on climate change which will improve the attitude ad behavior of the students to take the role as protector of the environment. Initialing the following activities should be undertaken by the University, first, concept of environmental education should be vertically and horizontally integrated in all studies to ensure the environmentally practices of CSU-Lasam students. Second, conducting campus-based environmental activities which can be participated by the students through hands on approach for them to be directly exposed is also important to increase their awareness on the effects of climate change and their environmental attitude which both have been been ranked fourth among the climate change awareness and environmental attitude sub-scales. Thirdly, carrying out *Kaibigan Ko ang Kalikasan Pogram* (KKKP) through the Campus Student Government (CSG) should be participated by all students focusing on tree-planting drive, solid waste management practices, conduct of campus climate change forum, etc . Lastly, development of a comprehensive campus climate change awareness and environmental action plan taking into consideration the findings highlighted in this study should be undertaken by the campus administration.

Further study should be conducted using more independent variables and wider samples of respondents using qualitative and quantitative research methods. Hence, a replication of this study in other Higher Education Institutions (HEIs) in the Philippines may be conducted to validate the results of the present study.

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