Pro-environmental behavior of learners using CADMIACA model

Comportamento pró-ambiental de alunos usando o modelo CADMIACA

Comportamiento proambiental de los estudiantes utilizando el modelo CADMIACA

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ABSTRACT

This research provides clear perspective with broad spectrum on the pro-environmental behavior (PEB) of learners. It sought to determine the level of awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior of learners, and the significant relationship and significant difference among the variables. The researcher utilized the descriptive-qualitative survey method; through the use of a questionnaire backed up with Key Informant Interview (KII) and triangulated by Focus Group Discussion (FGD). CADMIACA, the model of this research, are from the theories of Comprehensive Action Determination Model (CADM) Motivational, Interpersonal ones (MI) and the Action Competence Approach (ACA). For the empirically causal relationship among variables, structural equation methodology (SEM) was initiated. The study included 384 learners from junior and senior high school of NDDU-IBED Lagao, General Santos City, school year 2017-2018. Overall, there is no significant difference on the PEB of junior and senior high school learners; they had a moderate energy-saving behavior and high level of environmental education. On the other hand, there is a significant difference in the attitude and global warming of students. Another study is recommended, using other respondents from a subdivision or barangay to determine whether social status might affect the totality of PEB of an individual.

Keywords: Pro-Environmental Behavior, CADMIACA Model, Structural Equation Modeling, Junior and Senior High School Students, Philippines.

RESUMO

Esta pesquisa fornece uma perspectiva clara com amplo espectro sobre o comportamento pró-ambiental (PEB) dos alunos. Procurou determinar o nível de consciência, atitudes, intenção, motivação, interação social ambiental, educação ambiental e comportamento verde dos alunos, e a relação significativa e diferença significativa entre as variáveis. A pesquisadora utilizou o método de levantamento descritivo-qualitativo; através da utilização de um questionário apoiado em Key Informant Interview (KII) e triangulado por Focus Group Discussion (FGD). CADMIACA, o modelo desta pesquisa, são as teorias do Modelo Compreensivo de Determinação da Ação (CADM), Motivacional, Interpessoal (MI) e a Abordagem da Competência para a Ação (ACA). Para a relação empiricamente causal entre as variáveis, iniciou-se a metodologia de equações estruturais (SEM). O estudo incluiu 384 alunos do ensino fundamental e médio do NDDU-IBED Lagão, cidade de General Santos, ano letivo 2017-2018. No geral, não há diferença significativa no PEB dos alunos do ensino fundamental e médio; apresentaram comportamento moderado de economia de energia e alto nível de educação ambiental. Por outro lado, há uma diferença significativa na atitude e no aquecimento global dos alunos. Outro estudo é recomendado, usando outros entrevistados de uma subdivisão ou barangay para determinar se o status social pode afetar a totalidade do PEB de um indivíduo.

Palabras-chave: Comportamento Pró-Ambiental, Modelo CADMIACA, Modelagem de Equações Estruturais, Alunos do Ensino Fundamental e Médio, Filipinas.

RESUMEN

Esta investigación proporciona una perspectiva clara con un amplio espectro sobre el comportamiento proambiental (PEB) de los alumnos. Se buscó determinar el nivel de conciencia, actitudes, intención, motivación, interacción social ambiental, educación ambiental y comportamiento verde de los educandos, y la relación significativa y diferencia significativa entre las variables. El investigador utilizó el método de encuesta descriptivo-cualitativo; a través del uso de un cuestionario respaldado con una entrevista con informantes clave (KII) y triangulado por una discusión de grupo focal (FGD). CADMIACA, el modelo de esta investigación, son de las teorías del Modelo Integral de Determinación de la Acción (CADM), Motivacionales, Interpersonales (MI) y el Enfoque de Competencias para la Acción (ACA). Para la relación empíricamente causal entre variables se inició la metodología de ecuaciones estructurales (SEM). El estudio incluyó a 384 educandos de la escuela secundaria y preparatoria de la NDDU-IBED Lagao, ciudad de General Santos, año escolar 2017-2018. En general, no hay una diferencia significativa en el PEB de los estudiantes de secundaria y preparatoria; tenían un comportamiento de ahorro de energía moderado y un alto nivel de educación ambiental. Por otro lado, existe una diferencia significativa en la actitud y el calentamiento global de los estudiantes. Se recomienda otro estudio, utilizando a otros encuestados de una subdivisión o barangay para determinar si el estatus social podría afectar la totalidad del PEB de un individuo.

Palabras clave: Comportamiento proambiental, modelo CADMIACA, modelado de ecuaciones estructurales, estudiantes de secundaria y preparatoria, Filipinas.

INTRODUCTION

Nowadays, it is very evident with many examples that environmental problems have climaxed its quantity that looms the future of humans. Dissolved ice sheets in the Polar Regions, endangered species, and the lost habitat are few of many examples. Anthropogenic factors have immeasurable roles in the development of this pessimistic depiction. The insensible and erroneous practices against environmental standards convey around numerous complications (Baroro, Gorospe, Relox and Vedra, 2016). The health effects due to climate change are in operations for both direct and indirect systems making human infections and their interactions that include the estimates of exposure to health risks is in high complexity (Liang and Gong, 2017).

In the Philippines, having a population of more than 100 million, the situation generated a 0.5 kg per capita per day of an average solid waste or with an estimated average of 50, 000 metric tons (MT) per day. Just 35, 000 MT for each day are gathered and others have put to places which are not in the designated disposal facilities. Metro Manila alone is producing wastes with an estimated 0.7 kg per capita or 8, 354 MT every day plus the sum of 55 MT from healthcare waste (Gilbert and Ramos, 2012). The national policy on solid waste management (Republic Act 9003), the state of solid waste is such that the local chief officials look as if defeated on how to deal with it on an everyday basis. The traditional process of door-to-door collection and moving to the ultimate disposal facility can no longer be sustained (Sapuay, 2016).

The government of General Santos City had enacted Ordinance No.3 Series of 2014, regulating the use of plastic bags and expanded polystyrene or Styrofoam food service containers. The ordinance prohibits the use of plastic bags as packaging materials for dry goods and regulating its use on wet products; providing sanctions or revocation of business permits to all business establishments if they will not abide (Ordinance No. 03. Sangguniang Panlungsod ng General Santos City, 2014).

The need is to cultivate a behavior that is conscious of minimizing the dismissive partition of human activities in the environment. It is the clear evidence of what environmental education is all about, the system of "nature – human – society" presents an ecological situation making a tight interaction between society and nature that is a crucial factor to be ecologically sensitive (Zakharova, Liga, and Sergeev, 2015).

In line with this, there are still a lot of plastics or garbage scattered in school grounds without being tossed to legitimate canisters. Thus, the researcher would attempt to gain information and understanding on the pro-environmental behavior (PEB). Which includes awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior of the junior and senior high school learners in Notre Dame of Dadiangas University (NDDU) – Integrated Basic Education Department (IBED), Lagao, General Santos City.

Statement of the Problem

The researcher investigated the level of pro-environmental behavior (PEB) of junior and senior high school learners in NDDU-IBED Lagao using the CADMIACA model.

Specifically, this study answered the following sub-problems:

1. What is the level of awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior of junior and senior high school learners?

2. Is there a significant relationship between the variables such as awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior among the junior and senior high school learners?

3. Is there a significant difference in the level of awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior of junior and senior high school learners?

4. What are the views of the learners on the influence of awareness or environmental education to their environmental social interactions?

Theoretical Foundation

Past literature reflects a little amount of connection between the impacts of psychological factors on pro-environmental behavior (PEB) in a general perspective of daily life. In line with this, through the applications of the different theories mentioned above, the implementation of comprehensive and rigorous psycho-sociological model has been

introduced. This research is contemplating that awareness, attitudes, intention, motivation, environmental social interaction, environmental education, and green behavior were impacted the PEB of an individual through the model called CADMIACA (Varela-Candamio et al., 2017).

The CADMIACA model includes intrapersonal approach; Awareness as moral theories that entails NAT (pro-social motivations), NEP (environmental concern) interconnected with VBN. Attitudes as rational choice theories explained by TPB (self-interest & reasoned action), and Intention as a non-rational choice by TIP (habit & emotions). In Motivational are PMT (prevention) and CTS (self-efficacy) and Interpersonal ones explaining Social interaction are ST (social life), FTNC (social norms) and SIT (social identity). In Environmental Education is the ACA (knowledge). The totality of the model depicts the PEB or overall green behavior of every individual in daily activities (Varela-Candamio et al., 2017).

In this study, the independent variable is awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior. The dependent variable is the levels of learners' pro-environmental behavior (PEB) in Junior and Senior High School.

METHODOLOGY

This chapter presented the research methodology used in the investigation process. It discussed the research design, respondents of the study, research instruments, data gathering procedure and the statistical treatments used for data analysis.

Research Design

The researcher utilized the descriptive-survey method. The variables were the PEB components such as awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior that described the pro-environmental behavior (PEB) of junior and senior high school learners. The Key Informant Interview (KII) was employed to generate in-depth qualitative feedback from the respondents.

For outcomes reliability, the KII data were triangulated with Focus Group Discussion (FGD), where various members could have a chance to be of service for a spectrum of perspective (Lazar, Feng, and Hochheiser, 2017). Furthermore, as stated by Schaafsma, Beukering and Oskolokaite, (2017) FGDs substantiate the fundamental comprehension that underlying the attitudes and motives towards the suggested situations and regulate the setting. Figure 1 shows triangulation of the questionnaire, KII, and FGD.

Figure 1. Triangulation of Information
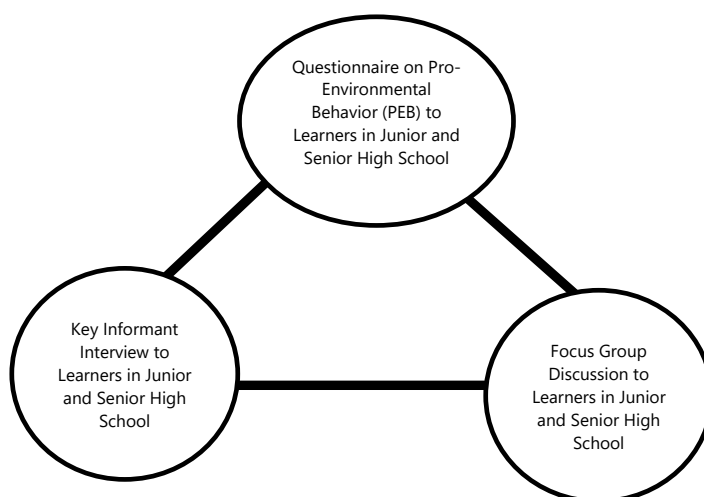
Source: author's elaboration

Respondents and Sampling

The respondents of this study were the officially enrolled learners of Junior and Senior High School of NDDU-IBED Lagao, General Santos City, school year 2017-2018. In deciding the sample size, 95% levels of certainty with 5% margin of error were determined. Sample size determination was from Lwanga (1991), the selection of the learners is through stratified random sampling. Five respondents for the Key Informant Interview and preferred ten respondents for Focus Group

Discussion. Both processes of gathering the needed data were conducted to the junior and senior high school learners. Table 1, 2, and 3 shows the distribution of respondents.

Table 1. Distributions of Respondents

Respondents	Total number of learners enrolled	Sample Group
Junior High School Learners	1, 162	152
Senior High School Learners	1, 782	232

Source: author's elaboration with research data

Table 2. Distributions of Respondents for Questionnaire – Junior High School

Grade Level	Total
7	39
8	38
9	37
10	38
Grand Total:	152

Source: author's elaboration with research data

Table 3 Distributions of Respondents for Questionnaire – Senior High School

Grade Level	Total
11	133
12	99
Grand Total:	232

Source: author's elaboration with research data

Research Instrument

The Questionnaire was adapted from Varela-Candamio et al., (2017), and used the 5-Point for options, where: 5 (always), 4 (often), 3 (sometimes), 2 (seldom), and 1 (never). There are seven fundamental categories which are the classification questions, energy savings behavior, awareness of global warming, green behavior, environmental-social interaction, environmental-informal education, and environmental-attitudes.

For content validity, previous recognized studies were from Hori et al., (2013) and Vicente-Molina et al., (2013). All questions presented the individual's ideas within the scope of environmental education. In line with this, all measures are included which is intended for the extent of education in the environment (Varela-Candamio et al., 2017). The researcher's adviser checked the dependability and comprehensively, and eventually from field masters from the past research of Varela-Candamio et al., (2017).

Data Gathering Procedures

The researcher submitted a letter to the School Principal asking permission to conduct the study among junior and senior high school learners. Upon approval of the request the researcher did the sampling of the respondents, 152 for junior high school and 232 for senior high school. After the sampling was done, the researcher personally conducted the questionnaires, the answered questionnaires were retrieved; data were tallied, statistically treated, analyzed and interpreted.

Data Analysis

This research utilized the CADMAICA model, qualitative research design and statistically broke down through structural equation modeling (SEM), applying the multiple regression systems together with combined correlation systems. The multivariate statistical technique can measure the latent variable that is not directly measuring the variables through factorial analysis. It is a rational method that proved the causations and to evaluate simultaneously multilevel inter-relationships between variables (Hair et al., 2010; Klem, 2000; Hershberger, 2003; Schumacker and Lomax, 2004).

In presenting quantitative data; responses gathered were recorded. Simple frequency counts and percentages were documented and utilized to present the results. The statistical tools that were employed are Frequency counts and percentages to determine the respondents' basic profiles; Mean to determine the respondents' level of awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior; Multiple Regression Analysis to determine the relationship between the variables.

All statistical tests were done at 0.05 level of significance. To interpret the quantitative data for weighted mean, the researcher utilized the standard scale range[1].

Based on the Multiple Linear Regression Analysis; "there is a significant relationship" is established and null hypothesis will be denied or disapproved; if the P-values is in 0.05 level of significance or below between the independent and dependent variables.

Ethical Consideration

There were numerous ethical issues and concerns that specifically affected this quantitative inquest. Such issues and concerns could mostly be caused by the method used in this study. The rights to conduct the study, secrecy, and anonymity are the subjects of the ethical disputes that were relevant to this research. The ability to participate freely without fear of negative consequences, fines, or lost benefits shall be given to the Junior High School and Senior High School students. As a result, once the participating school was informed of the study's goals and advantages. Next, the respondents' legal right to add to the body of knowledge was carefully considered and upheld. The information on respondents' personal lives that the researcher may have needed for the study was kept secret and with the strictest discretion. The researcher must assure that the research instrument (survey questionnaires and interview guide questions) were free for technical terms so that they can simply comprehend it. The study did not include scenarios with high potential for physical, psychological, or socioeconomic problems for respondents. The study is only concerned with their motivation for learning. The study had no traces or evidence of misrepresenting someone else's work as one's own were found in the study. The study was subjected to plagiarism detection tools like Grammarly and Turnitin. Finally, plagiarism, fabrication and falsifications were strictly observed

RESULTS

This section deals with presentation, analysis, and interpretation of the data gathered in this study. The various results are presented in the succeeding tables with corresponding discussions and explanations. It also answers specific problems stated in the introduction.

Level of Learners Pro-Environmental Behavior (PEB)

Table 4. Level of Junior High School Learners' Energy Saving Behavior

Indicators	Mean	Description
I use curtains.	4.37	Often
The whole family watches TV in the same device	3.76	Often
I buy and use Light Emitting Diode (LED).	3.68	Often
I do not turn the lights on excessively.	3.46	Sometimes
I adjust the temperature to avoid excessive energy consumption (refrigerator).	3.32	Sometimes
I put the highest temperature (air-condition system).	3.08	Sometimes
I open the window (air-condition system).	3.01	Sometimes
I use the automatic shutdown of TV device.	2.69	Sometimes
I watch TV.	2.43	Seldom
I put hot food in the refrigerator after cooling.	2.38	Seldom
Mean	**3.22**	**Sometimes**

Source: author's elaboration with research data

Among the junior high school learners, they **often** manifest three energy-saving behavior: I use curtains (M=4.37); the whole family watches TV in the same device (M=3.76), and I buy and use Light Emitting Diode (LED) (M=3.68). They **sometimes** show five energy saving behavior: I do not turn on the lights excessively (M=3.46); I adjust the temperature of the refrigerator to avoid excessive energy consumption (M3.32); I put the highest air-condition temperature (M=3.01); and I use the automatic shutdown of TV device (M=2.69). Summarily, the overall mean of 3.22 indicates that the junior high school learners **sometimes** manifest the energy saving behavior.

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[1] 5 (Always), 4 (Often), 3 (Sometimes), 2 (Seldom), 1 (Never).

Table 5. Level of Senior High School Learners' Energy Saving Behavior

Indicators	Mean	Description
I use curtains.	4.19	Often
The whole family watches TV in the same device	3.74	Often
I do not turn the lights on excessively.	3.49	Sometimes
I put the highest temperature (air-condition system).	3.30	Sometimes
I buy and use Light Emitting Diode (LED).	3.27	Sometimes
I adjust the temperature to avoid excessive energy consumption (refrigerator).	3.14	Sometimes
I open the window.	3.00	Sometimes
I use the automatic shutdown of TV device.	2.89	Sometimes
I watch TV.	2.82	Sometimes
I put hot food in the refrigerator after cooling.	2.53	Sometimes
Mean	**3.24**	**Sometimes**

The senior high school learners **often** display two energy-saving behavior: I use curtains (M=4.19); and the whole family watch TV in the same device (M=3.74). They display **sometimes** in the other eight energy saving behavior: I do not turn on the lights excessively (M=3.49); I put the highest temperature on air-condition system (M=3.30); I buy and use LED lights (M=3.27); I adjust the temperature of the refrigerator to avoid excessive energy consumption (M=3.14); I open the windows (M=3.00); I use the automatic shutdown of the TV (M=2.89); I watch TV (M=2.82); and I put hot food in the refrigerator after cooling (M=2.53). The summary data in table 5 reveal that the senior high school learners manifest the energy saving behavior **sometimes** (M=3.24).

Table 6. Level of Junior High School Learners' Awareness on Global Warming

Indicators	Mean	Description
For reducing the risk of global warming involvement of society is needed (not do it alone).	4.53	Always
It is necessary to share expenses (e.g. the car) to reduce global warming.	3.84	Often
The main cause of global warming is the use of electricity.	3.54	Often
The main cause of global warming is the use of air conditioner.	3.28	Sometimes
It is necessary to rise up the prices of goods and services to reduce global warming.	2.99	Sometimes
Mean	**3.63**	**Often**

Table 6 gives the data on the level of the junior high school learners on global warming. The involvement of the society is needed to reduce the risk **always** (M=4.53); sharing of expenses is needed to reduce global warming **often** (M=3.84); the main cause of global warming is electricity **often** (M=3.54). However, the junior high school learners say that **sometimes** the cause of global warming is the use of air conditioners (M=3.28); and raise the prices of goods to reduce global warming (M=2.99). The level of awareness of junior high school learners is **often** (M=3.63).

Table 7. Level of Senior High School Learners' Awareness on Global Warming

Indicators	Mean	Description
For reducing the risk of global warming involvement of society is needed (not do it alone).	4.03	Often
It is necessary to share expenses (e.g. the car) to reduce global warming.	3.39	Sometimes
The main cause of global warming is the use of electricity.	3.32	Sometimes
The main cause of global warming is the use of air conditioner.	3.04	Sometimes
It is necessary to rise up the prices of goods and services to reduce global warming.	2.84	Sometimes
Mean	**3.32**	**Sometimes**

The senior high school learners **often** aware that to reduce the risk of global warming, the involvement of society is needed (M=4.03). Sharing of expenses is **sometimes** (M=3.39). The cause of global warming is electricity, **sometimes** (M=3.32); cause of global warming is the use of air conditioners **sometimes** (M=3.04) and raising the prices of goods and services reduces global warming **sometimes** (M=2.84). The level of awareness of the senior high school learners is **sometimes** (M=3.32).

Table 8. Level of Junior High School Learners' Green Behavior

Indicators	Mean	Description
I let fresh air coming into the rooms.	4.15	Often
I make homemade food.	4.10	Often
I recycle.	4.08	Often
I use the public transport.	3.98	Often
I recycle my bags.	3.93	Often
Mean	**3.74**	**Often**

The junior high school learners employed the following green behavior: letting free air comes into their rooms **often** (M=4.15); make homemade food **often** (M=4.10); recycle **often** (M=4.08); use public transport **often** (M=3.98); and I recycle my bags **often** (M=3.93). The grand mean of 3.74 suggests that junior high school learners have a **moderate level** of green behavior.

Table 9 Level of Senior High School Learners' Green Behavior

Indicators	Mean	Description
I use the public transport.	4.22	Often
I let fresh air coming into the rooms.	4.01	Often
I make homemade food.	3.99	Often
I recycle.	3.94	Often
I recycle my bags.	3.93	Sometimes
I reuse water for several uses.	3.01	Sometimes
Mean	**3.70**	**Often**

The senior high school learners **often** used public transport (M=4.22); **often** let fresh air into their rooms (M=4.01); **OFTEN** make homemade food (M=3.99); **often** they recycle (M=3.94). However, they **sometimes** reuse water (M=3.01). The overall mean of 3.70 indicates a **moderate level** of green behavior.

Table 10. Level of Junior High School Learners' Environmental Social Interaction

Indicators	Mean	Description
I respect their opinions (related to communication with family).	4.34	Often
I agree with environmental standards developed by the relevant authorities (related to compliance with rules to promote respect for the environment).	4.33	Often
I respect their opinions (related to communication with schoolmates).	4.29	Often
I respect their opinions (related to communication with peers).	4.14	Often
I meet standards of environmental friendliness (related to compliance with rules to promote respect for the environment).	4.01	Often
Mean	3.67	Often

Table 10 shows the environmental social interaction of junior high school learners. **Often**, they respect their opinions related to communication with family (M=4.34); **often** agree with environmental standards developed by relevant authorities (M=4.33); **often** respect opinions related to communication with schoolmates (M=4.29) and peers (M=4.14); and **often** meet the standards of environmental friendliness (M=4.01). The grand mean of 3.67 appears that the junior high school learners have a **high level** of environmental social interaction.

Table 11 Level of Senior High School Learners' Environmental Social Interaction

Indicators	Mean	Description
I respect their opinions (related to communication with schoolmates).	4.19	Often
I respect their opinions (related to communication with family).	4.11	Often
I agree with environmental standards developed by the relevant authorities (related to compliance with rules to promote respect for the environment).	4.04	Often
I respect their opinions (related to communication with peers).	4.00	Often
I wish to participate in group activities (related to awareness of community involvement).	3.95	Often
I talk to them about it (related to communication with family).	3.93	Often
I respect their opinions (related to communication with neighbors).	3.79	Often
Mean	**3.64**	**Often**

Table 11 displays the level of senior high school learners' environmental social interaction. **Often**, the students respect the opinions of their schoolmates (M=4.19); with family (M=4.11); with peers (M=4.00); and with neighbors' (M=3.79). They agreed with environmental standards developed by authorities (M=4.04) and participated in group activities (M=3.95). The overall mean of 3.64 connotes a **high level** of environmental social interaction.

Table 12 Level of Junior High School Learners' Environmental Informal Education

Indicators	Mean	Description
Media (watch TV and/or read newspapers) improve my knowledge about environmental issues.	4.34	Often
My social interaction (with family, friends, etc.) improves my knowledge about environmental issues.	4.03	Often
I do use the Internet to improve my knowledge about environmental issues.	3.95	Often
Mean	**4.11**	**Often**

Often the junior high school learners improve their knowledge about environmental issues through media such as watching on TV or reading the newspaper (M=4.34); by their social interactions with family and friends (M=4.03); and the use of the internet (M=3.95). The JHS obtained a mean of 4.11, and they had a **high level** of environmental informal education.

Table 13. Level of Senior High School Learners' Environmental Informal Education

Indicator	Mean	Description
Media (watch TV and/or read newspapers) improve my knowledge about environmental issues.	4.28	Often
I do use the Internet to improve my knowledge about environmental issues.	4.15	Often
My social interaction (with family, friends, etc.) improves my knowledge about environmental issues.	4.08	Often
Mean	**4.17**	**Often**

The highest mean obtained by senior high school learners were on improved knowledge about environmental issues through media such as watching on TV or reading of newspaper (M=4.28) followed by the usage of the internet (M=4.15) and through social interaction with family and friends (M=4.08). The SHS obtained a mean of 4.17 and which is a **high level** of environmental informal education.

Table 14. Level of Junior High School Learners' Environmental Attitudes

Indicators	Mean	Over-all Mean	Description
Motivation			
I am sensitive to the price of products purchased.	4.34		Often
I consider myself an altruistic person.	3.64		Often
		3.99	**Often**
Attitudes			
I am concerned about the risk of global warming.	4.53		Always
It is important to establish incentives for green purchasing	4.03		Often
The resources I consume are indispensable to what I will not cause pollution	3.70		Often
		4.09	**Often**
Perceived effectiveness of behaviour			
Will reduce environmental problems.	4.07		Often
Carries no effect on environmental issues.	3.09		Sometimes
		3.58	**Often**
Grand Mean		**3.89**	**Often**

Table 14 records the environmental attitudes of the junior high school learners according to rank: attitudes (M=4.09) **often**; motivation (M=3.99) **often**; and perceived effectiveness of behavior (M=3.58) **often**. The grand mean of 3.89 signifies that the junior high school learners have a **high level** of environmental attitudes.

Table 15. Level of Senior High School Learners' Environmental Attitudes

Indicators	Mean	Over-all Mean	Description
Motivation			
I am sensitive to the price of products purchased.	4.11		Often
I consider myself an altruistic person.	3.62		Often
		3.87	**Often**
Attitudes			
I am concerned about the risk of global warming.	4.28		Always
It is important to establish incentives for green purchasing	3.86		Often
The resources I consume are indispensable to what I will not cause pollution	3.67		Often
		3.94	**Often**
Perceived effectiveness of behavior			
Will reduce environmental problems.	3.89		Often
Carries no effect on environmental issues.	3.54		Often
		3.72	**Often**
Grand Mean		**3.84**	**Often**

Similarly, the senior high school learners' environmental attitudes are characterized by three parameters: motivation, attitudes and perceived effectiveness of behavior. They manifest the same ranking of importance of these indicators of environmental attitudes: attitudes (M=3.94) **often**; motivation (M=3.87) **often**; and perceived effectiveness of behavior (M=3.72) **often**. The grand mean of 3.84 signifies that they have a **high level** of environmental attitudes.

Table 16. Summary Table of Junior High School Learners' Pro-Environmental Behavior (PEB)

Indicators	Mean	Description
Environmental Informal Education	4.11	Often
Attitude	4.09	Often
Motivation	3.99	Often
Green Behavior:	3.74	Often
Environmental Social Interaction	3.67	Often
Awareness on Global Warning	3.63	Often
Perceived Effectiveness of Behavior	3.58	Often
Energy Saving Behavior	3.22	Sometimes
Over-all Mean	**3.89**	**Often**

Table 20 shows the summary of the level of the junior high school in their pro-environmental behavior (PEB). They describe the levels of their PEB, thus ranked from the highest to the lowest: environmental informal education, **often** (M=4.11); attitude, **often** (M=4.09); motivation, **often** (M=3.99); green behavior, **often** (M=3.74); environmental social interaction, **often** (M=3.67); awareness on global warming, **often** (M=3.63); perceived effectiveness of behavior, **often** (M=3.58); and energy saving behaviour, **sometimes** (M=3.22). The overall mean of 3.85 describes a **high level** of pro-environmental behavior (PEB) among the junior high school learners.

Table 17. Summary Table of Senior High School Learners' Pro-Environmental Behavior (PEB)

Indicators	Mean	Description
Environmental Informal Education	4.17	Often
Attitude	3.94	Often
Motivation	3.87	Often
Perceived Effectiveness of Behavior	3.72	Often
Green Behavior	3.70	Often
Environmental Social Interaction	3.64	Often
Awareness on Global Warning	3.32	Sometimes
Energy Saving Behavior	3.24	Sometimes
Over-all Mean	**3.84**	**Often**

Table 17 shows the summary of the level of learners PEB among senior high school learners. Environmental informal education is **often** practiced (M=4.17). The other five PEB are described as attitude **often** (M=3.94); motivation **often** (M=3.87); perceived effectiveness of behavior **often** (M=3.72); green behavior, **often** (M=3.70); environmental social interaction **often** (M=3.64); awareness on global warming (M=3.32); and energy saving behavior are rated **sometimes** (M=3.24). The overall mean of 3.84 describes a **high level** of PEB among senior high school learners.

| Assessment	JHS Mean	SHS Mean	t - computed	p-value	Remark
Environmental Informal Education	4.11	4.17	-1.13	0.26	NS
Attitude	4.09	3.94	3.49	0.00	S
Motivation	3.99	3.87	1.91	0.06	NS
Green Behavior	3.74	3.69	1.22	0.23	NS
Environmental Social Interaction	3.67	3.64	1.32	0.19	NS
Global Warming	3.63	3.32	6.31	0.00	S
Effectiveness of the Behavior	3.58	3.72	-1.69	0.09	NS
Energy Saving Behavior	3.21	3.24	-0.46	0.64	NS
Over-all	**3.89**	**3.84**	**1.55**	**0.12**	**NS**

significant at p=0.05   S= significant   NS= not significant

Overall there is **no significant difference** on the PEB of learners in junior and senior high school; as evidenced by the t-computed value of 1.55 and p-value of 0.12. The no significant difference implies that the level of PEB of learners is the same and this was signified by their mean values of 3.89 and 3.84. Similarly there is **no significant difference** on the environmental informal education (t-value = -1.13 and p-value = 0.26), motivation (t-value = 1.91 and p-value = 0.06), green behaviour (t-value = 1.22 and p-value = 0.23), environmental social interaction (t-value = 1.32 and p-value = 0.19), effectiveness of the behavior (t-value = -1.69 and p-value = 0.09) and energy saving behavior with a t-value of -0.46 and p-value of 0.64. These mean that the learners both in junior and senior high school have the same levels of PEB in the six identified indicators.

On the other hand, there is **a significant difference** on the PEB of learners on attitude (t-value = 3.49 and p-value = 0.00) and global warming (t-value = 6.31 and p-value = 0.00). This reveals that the junior high school learners have a higher level of PEB in attitude and awareness on global warming than the senior high school learners.

Structural Equation Modeling

Figure 2. Structural Equation Model (SEM) of Pro-Environmental Behavior of Junior and Senior High School Learners in NDDU-IBED Lagao
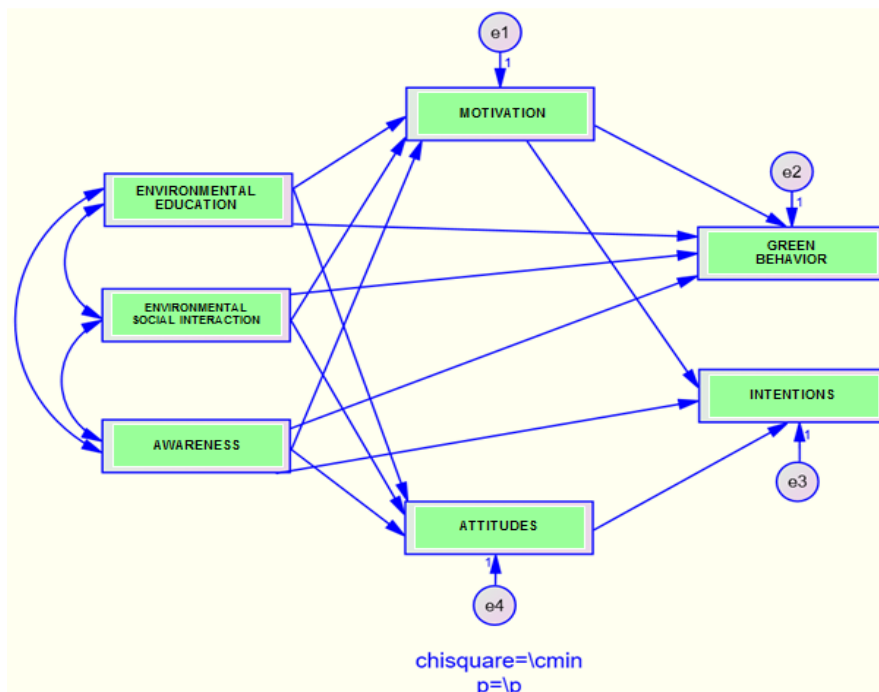
The relationship among PEB obtained in this study is depicted in figure 3. It is taken into account the relationship among variables that were significantly correlated to each other. It appears that awareness is correlated with green behavior and intention; the environmental social interaction has an effect on attitudes and awareness; environmental education has a direct influence on motivation. It can also glean from figure 3 that there are 3 reciprocal correlations or relationship of variables namely: environmental education and motivation; awareness and intentions; and awareness and green behavior.

Multiple Linear Regression Analysis

Table 19. Summary of the CADMIACA Model in Determining the Multiple Linear Regressions of Learners in Junior and Senior High School

Variables	Explicative Variables	Influence	Beta	T	Sig.	Remarks
1. **Environmental Social Interaction**	Attitudes	Direct	.163	3.091	.002	S
2. **Environmental Education**	Motivation	Direct	.369	7.897	.000	S
3. **Intention**	Awareness	Direct	.122	2.456	.014	S
4. **Green Behavior**	Awareness	Direct	.102	2.036	.042	S
5. **Motivation**	Social Interaction	Direct	.143	3.091	.002	S

Table 19 confirms the relationship of some variables as depicted in figure 3 (SEM). Using multiple correlations and regression analysis, the following are the variables: Social interaction to attitudes and motivation; environmental education to motivation; and awareness got two direct influenced, the intention and green behavior.

Focus Group Discussion (FGD) and Key Informant Interview (KII)

The analyses and the discussions of table data were given in-depth meanings and significance through focus group discussion (FGD) and key informant interviews (KII) among junior and senior high school learners, specifically their pro-environmental behavior (PEB). The researcher recorded their responses for clearer and accurate transcriptions later.

Energy Saving Behavior

The learners had perceived that to save energy in school and community; they turn off the appliances if not in use and unplugged the wires, turn off the lights if they to sleep. When they use the air-conditioning system in their homes it should be for a couple of hours. If they have any experiences in home or school that the current has exploded due to overloading of appliances, they immediately remove the wire and never use it again; they immediately report to the authorities to handle the incident to avoid any injuries; never panic.

Awareness of Global Warming

The learners observe that the central cause of global warming is the anthropogenic reason which results from the human activities that produce damages to the environment such as pollution and deforestation. The simple things they do in their community with regards to global warming are a tree planting and reduce, reuse and recycle or the 3Rs. These activities help maintain clean and green surroundings.

The reaction of learners with regards to an inflation rate of goods is "yes" if it helps reduce global warming. According to them, rising prices of commodities is tied up with manufacturing processes and with the idea of demand and supply. If the demand for goods is high but the supply is low, the manufacturing industry produces more goods; that needs more energy and fossil fuel. The learners had thought to help alleviate the said phenomena through tree planting, waste segregation, and plastic ban.

Green Behavior

The learners had done some recycling activities in the home or school. They recycled or reused the plastic bottles or used papers to do their projects or performance tasks in school.

Most of them reused their water resources in their homes such as after the laundry they use it to water the plants and wet the soil in their backyard. During weekdays or weekends, if they had time, they planted some vegetables around their homes. The learners cannot recall what particular goods they bought that were organic or made of green products.

Environmental Social Interaction

Some learners promote taking care of the environment most of the times in their respective homes and in school, but others do not care at all. They also encourage their siblings and parents to care for the environment; like throwing garbage in the garbage bins and not just throwing these anywhere. Learners say that their environmental standards are still the 3Rs and waste segregation because according to them, these are the simple things they do to contribute to a clean and safe environment.

The learners have recognized the name of the primary government agency that works to protect the environment; the Department of Environmental and Natural Resources (DENR). They feel their presence in preserving life and the environment through the news on the television or due to activities in the community that the DENR spearheads. Some of

these activities which they participate are tree planting, clean-up drive and coastal clean-ups on selected areas or barangays of the city.

The learners were asked if they had caught someone burning leaves or garbage; did they report it to their barangay officials. Most of them said "no". They say that they are still minors, and they do not have the courage to be involved in barangay disputes including their parents. But if it involves their relatives, they may tell them not to do it again. They are aware that we are experiencing climate change or global warming and that burning leaves or garbage is a violation of the city ordinance.

Environmental Informal Education.

According to the learners, they had gathered additional information on climate change, global warming and the preservation of the environment through internet, books, news on TV or newspapers and lectures in school.

Some of the learners confessed that their learning's' in school is enough because the application of these in their homes and communities are not checked by their teachers. They listen to what is letting them but if the teachers do not reprimand their actions they do not care at all.

The interactions of the learners that improved their knowledge about environmental issues at home are with their parents and siblings when they together watch television news about the environment which they discuss even during meal time. In school, the teachers always remind the learners to take care of the environment.

Environmental Attitudes.

The learners are motivated to help mother earth against global warming and are fully aware that they should do their part. They perceived that due to lack of discipline, garbage or trash are thrown out everywhere.

With regards to buying items in the bookstores or department stores, they practice practicality on buying; check the quality and the price comparing the different brands before they buy the item. For their pollution control measures in the home or school, they never burn any plastic materials and they segregate their trash. The learners said that they do not need to be rewarded before helping the environment and no need of an incentive.

The responses of the learners on why they need to be an earth warrior are to preserve a clean and safe environment. They perceived that we only have one earth. With their simple ways to help alleviate global warming, they said that the effective action is to attend or participate in seminars, clean-up drives or be involved in any barangay action program for the environment. In a nutshell, most of the learners say that everyone should put our words into actions so we can make a difference for mother for mother earth. Let us act now before it is too late.

DISCUSSION

As shown in table 4 and 5, the junior and senior high school learners had a **moderate level** of awareness in energy-saving behavior. They are aware of conserving energy by doing simple things like opening windows to let fresh air comes in instead of using air conditioning units, turning off the lights and other appliances when not in use. Similar results were also found in the study of Cruz and Tantengco (2017). Learners agreed that by recycling, reusing and reducing they can help conserve the world's resources (Sumaylo, 2016). Likewise, the leadership roles of their parents and elders at home, teachers in the school have great influence on their energy saving behavior (Blok et al., 2015).

The junior and senior high school learners have perceived that by reducing the risk of global warming, the involvement of society is needed not doing it alone. The junior high school learners have a **high level** of awareness on global warming, while the senior high school learners have a **moderate level**. These understandings are coming from their knowledge and personal experiences together with the government actions which are supported by the study of Barreda (2018). The learners agree that pollution and deforestation or anthropogenic reasons were the main causes of global warming. By seeing these causes it gave us the need to indicate the social-psychological factors in qualifying the level of public environmental awareness and behavior (Mei et al., 2016). Comparing these results with the study of Ejem, (2013) the learners move towards the mastery of environmental knowledge, attitudes and values and decision-making abilities at home, in school, and in the community.

In support in the results of table 4 and 5 which is in moderate level. According to the data on environmental awareness, the majority of the students were well informed and proved to having deeper grasp of environmental issues. However, the data on self-reported ecologically responsible behavior revealed that only a small percentage of students practiced friendly environmental behavior (Handoyo et al., 2021).

Letting the fresh air come into the rooms and the use of public transportation are the most evident green behaviors of the junior and senior high school learners. The learners have the will-power to changes their habits towards sensible behavior which is similar to the study of Fabi et al., (2017). Green behavior in school was manifested during the making of performance tasks, the learners use recycled materials, comparing this to the study of Ruepert et al., (2017) it can be concluded that encouraging a behavior that is pro-environmental, can help a significant decrease of environmental problems.

The respect of opinions of members of the family and schoolmates are the highest environmental social interactions of the learners in junior and senior high school that registered a **high level** of awareness to environmental social interaction. Similar results were also found in the study of Agena et al., (2015). Comparing the results to the study of Gifford and Nisson, (2014) it can be concluded that social norms and class with cultural and ethnic variations are factors to establish environmental social interactions to the learners. However, the finding of this study is somehow in contrast to the study of Poškus (2018) in which value orientations and perceived descriptive norms may not play a significant role in explaining pro-environmental activities. This is because the student's attitude may not necessarily transcribe into behavioral intentions.

The learners had improved their environmental education through the media like television or newspapers. This can be interpreted that to every educational curriculum, the essential dimension is to establish environmental citizenship among the learners. The same results were seen in the study of Orellana-Ríos et al., (2017). The learners have learned from school that habitat destructions were the most common reasons that an animal species become extinct. Thus, environmental education helps the learners experience the natural world and life's sustenance, healthy communities, and provision of food (Baroro et al., 2016). In addition, initiating environmental education program elevate the eco-literacy of students. This would also help in cultivating the passion and care of students toward the environment. In everyday life, enthusiasm of students was highly manifested for having an attitude of caring to the environment. This is due to emotional conditioning in each of them, which has a good influence on acting and having a responsible attitude (Fadjarajani, 2021).

Learners in junior and senior high school had a **high level** of motivation on being sensitive to the price of products they purchase. The learners show a positive attitude towards the environment; it increases their levels of motivation and engagement. Similar results were found in the study of King, (2016). The learners were motivated to help mother earth against global warming; they had the initiative and were fully aware that they should do their part (Kim et al., 2013). Comparing the results to the study of Martinez et al., (2015) it can be noted that attitudes and behavior are interlinked to provide a feedback for the environment (Nunez and Clores, (2017). Likewise, the environmentally-mindful individuals show responsible behaviors were polished in order to decrease hazards arising from environmental problems (Atav et al., 2015). Further, a certain study revealed in support of the findings that the development of climate-conserving behaviors is mostly influenced by self-determined motivation (Nur Sabrina Mohamed, 2021).

For the over-all PEB of the learners, environmental education, attitudes, and motivation were revealed as the core drivers to expect PEB. Based on the study of Zsóka et al., (2013) environmental education was having a significant influence on learners' environmental awareness, everyday lifestyles; and that there was a strong correlation on environmental education and environmental knowledge of the learners and their higher intrinsic motivation. In line with this, to shape the attitude of sustainable consumption, environmental education plays a vital role. Lai and Cheng, (2016) in their study, said that through structural equation modeling this study closefisted a picture of learners' expectations of green marketing practices, environmental perception, and purchasing behavior. In order for the marketers to formulate strategies that inspired the well-educated learners in consuming green products. Therefore, these results indicated that through education, we could uphold the value of taking good care of our environment for future generations.

On the structural equation model (SEM), the results showed awareness was highly affected by the degree of green behavior and intention. This was interpreted that pro-environmental self-identity significantly moderated the impact of perceived behavioral control on intentions and the effect of past behavior on both intentions and behaviors (Carfora, 2012). These results were supported by the study of Arisal and Atalar, (2016). The extents of social interaction of the learners were affected by the degree of attitudes and awareness. The same results with Fransman and Timmeren; (2017) it speaks about behavioral attitude and control which evolved from the beliefs of people of a particular behavior. Likewise, it included practices that were more undoubtedly observed, also toward instantaneous costs as far as money, time, and effort is concerned (Schmitt et al., (2017).

Comparing the results with Kaida and Kaida, (2016) it can be perceived that psychological factors such as optimism was necessary and were beneficial to the society to facilitate an increase of PEB. It is also shown that environmental education has a direct influence on motivation. This is interpreted as the sense of self-responsibility is important to be motivated by being environmentally responsible (Yu et al., 2017). Comparing it to the study of Lai and Cheng, (2016) learners expect practices that are based on the formulated strategies to keep the students motivated in consuming green products. Thus, learners higher intrinsic motivation is influenced by environmental education and environmental knowledge (Zsóka et al, 2013).

CONCLUSIONS

As a result of these circumstances, it was concluded that the level of learners' Pro-Environmental Behavior (PEB) in junior and senior high school is on the same high level which has a description of "often". The CADMIACA model fits the PEB of the junior and senior high school learners in NDDU-IBED Lagao. The said model contained a broad range of control conditions that determined the PEB of the learners' such as global warming, energy savings, recycling, green purchasing, and pollution.The structural equation modeling (SEM) reveals that awareness, attitudes, intention, motivation, environmental social interaction, environmental education and green behavior are the predictors of PEB. Among these indicators, environmental education, attitude and motivation are the powerful tools to generate PEB among learners. Therefore, the human behavior has a critical role to mobilize environmental protection and conservation amongst the citizenry, and the school policymakers can make a change in the learners' environmental conscious mind through regulation, information, and market-based instruments.

Study Limitations and Future Agenda

Despite of the overwhelming results there were still limitations that the researchers has to consider. This study only touched on Junior and Senior High School students of NDDU-IBED Lagao, General Santos City. Hence, the findings were not as generalizable since samples were not included other high school respondents from other schools in General Santos City. In addition, the researchers were not able to come up with an environmental program or output based on the results of the study, where activity matrix were made in order to improved pro-environmental behavior indicators that are in moderate level. Further, future research can be made using predictor variables that touches the cognitive aspects of students like scientific inquiry and literacy to the relationship of pro-environmental behavior of students. Hence, we can create another model based on the results of regression analysis of the predictor variables.

REFERENCES

Agena, E.M., Tiongson, B.L., Arevalo, B., Clemeno, M.C., Dolor, G., Laguador, J.M. (2015). Asian Journal of Basic and Applied Sciences. 2, 1.

Ajzen, I. (1991). The theory of planned behavior. Organization Behavior and Human Decision Process. 50, 179-211.

Arisal, I., Atalar, T. (2016). The exploring relationships between environmental concern, collectivism and ecological purchase intention. Procedia-Social and Behavioral Sciences. 235, 514-521.

Atav, E., Altunoğlu, B. D., Sönmez, S. (2015). The determination of the environmental attitudes of secondary education students. Procedia - Social and Behavioral Sciences. 174, 1391–1396.

Barreda, A. (2018). Assessing the level of awareness on climate change and sustainable development among students of Partido State University, Camarines Sur, Philippines. Journal of Sustainable Education. 17.

Baroro, M.L.E., Gorospe, J.G., Relox, R.E., Vedra, S.A. (2016). Environmental education embedded in k-12 program in urban and rural secondary schools in Iligan City, Lanao del Norte, Philippines. World Journal of Educational Research. 3, 4.

Blok, V., Wesselink, R., Studynka, O., Kemp, R. (2015). Encouraging sustainability in the workplace: a survey on the pro-environmental behavior of university employees. Journal of Cleaner Production. 106, 55-67.

Carfora, V., Caso, D., Sparks, P., Conner, M. (2012). Moderating effects of pro-environmental self-identity on pro-environmental intentions and behavior: a multi-behavior study. Journal of Environmental Psychology. 53, 92-99.

Cialdini, R.B. (2003). Crafting normative messages to protect the environment. Current Directions in Psychological Science. 12, 105-109.

Choeisuwan, V. (2015). Association of interest in receiving information, society's support and energy saving responsibility with energy-saving behavior of the nursing students at the royal Thai navy college of nursing. Procedia - Social and Behavioral Sciences. 197, 1031–1036.

Cruz, J.P., Tantengco, N.A. (2017). Students' environmental awareness and practices: basis for development of advocacy program. Jurnal Indonesia untuk Kajian Pendidikan. 2,1.

Dunlap, R.E. (2008). The new environmental paradigm scale: from marginality to worldwide use. Journal of Environmental Education. 40, 3-18.

Ejem, L.A., Bello, A.Q. (2013). Environmental awareness, literacy and biodiversity conservation practices of freshmen students in Bukidnon state university, Philippines. International Research Journal by PAIR. 1.

Fabi, V., Nicoli, M.V.D., Spigliantini, G., Corgnati, S.P. (2017). Insights on pro-environmental behavior towards post-carbon society. Energy. Procedia. 134, 462–469.

Fadjarajani, S., & R, A. (2021). Ecopedagogy based learning as an effort to increase student ecoliteration and the development of environmental care characters. IOP Conference Series. Earth and Environmental Science, 683(1).

Fransman. R., Timmeren, A.V. (2017). Psychological and social factors underlying pro-environmental behavior of residents after building retrofits in the city-zen project. Energy Procedia. 122, 1051–1056.

Focus group protocol (n.d.). Available at: https://baselinesupport.campuslabs.com/hc/en-us/.../BC_Focus_group_guide.docx . (Accessed 8 December 2017).

Foster, C.E., Horwitz, A., Thomas, A., Opperman, K., Gipson, P., Burnside, A., Stone, D.M., King, C.A. (2017). Connectedness to family, school, peers, and community in socially vulnerable adolescents. Children and Youth Services Review. 81, 321-331.

Gächter, S., Gerhards, L., Nosenzo, D. (2017). The importance of peers for compliance with norms of fair sharing. European Economic Review. 97, 72-86.

Giddens, A. (1984). The Constitution of Society: Outline of the Theory of Structuration. Polity Press, Oxford, United Kingdom.

Gifford, R., Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behavior: a review. International Journal of Psychology. 49, 141-157.

Gilbert, N., Ramos, D. (2012). Mechanized solid waste processing facility in Payatas, Quezon City. Powerpoint presentation during the SWAPPCon 2012. November 21, 2012.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010). Multivariate Data Analysis: A Global Perspective. Pearson, Upper Saddle River, New Jersey.

Handoyo, B., Astina, I. K., & Mkumbachi, R. L. (2021). Students' environmental awareness and pro- environmental behaviour: Preliminary study of geography students at state university of malang. IOP Conference Series. Earth and Environmental Science, 683(1).

Hargreaves, T. (2008). Making Pro-environmental Behaviour Work: an Ethnographic Case Study of Practice, Process and Power in the workplace. Unpublished (Ph.D. thesis). University of East Anglia, Norwich, United Kingdom.

Homburg, A., Stolberg, A. (2006). Explaining pro-environmental behavior with a cognitive theory of stress. Journal of Environmental Psychology. 26, 1-14.

Hori, S., Kondo, K., Nogata, D., Ben, H. (2013). The determinants of household energy-saving behavior: survey and comparison in five major Asian cities. Energy Policy. 52, 354-362.

Jenkins, R. (2008). Social Identity. Taylor & Francis, London, United Kingdom.

Jensen, B.B., Schnack, K. (2006). The action competence approach in environmental education: reprinted from environmental education research (1997). Environ Education Research. 12, 471-486.

Kaida, K., Kaida, N. (2016). Wake up for the environment: An association between sleepiness and pro-environmental behavior. Personality and Individual Differences. 104, 12–17.

King, R.B. (2016). Gender differences in motivation, engagement and achievement are related to students' perceptions of peer—but not of parent or teacher—attitudes toward school. Learning and Individual Differences. 52, 60-71.

Kim, S., Jeong, S.-H., Hwang, Y. (2013). Predictors of pro-environmental behaviors of American and Korean students the application of the theory of reasoned action and protection motivation theory. Science Communication. 35, 168-188.

Lai, C.K.M., Cheng, E.W.L. (2016). Green purchase behavior of undergraduate students in hong kong. The Social Science Journal. 53, 67-76.

Liang, L., Gong, P. (2017). Climate change and human infectious diseases: a synthesis of research findings from global and spatio-temporal perspectives. Environmental International. 103, 99-108.

Lwanga, S.K., Lemeshow, S. (1991). Sample size determination in health studies a practical manual. Epidemiological and Statistical Methodology. World Health Organization (WHO). Geneva, Switzerland.

Major, L., Namestovski, Ž., Horák, R., Bagány, Á., Krekić, V.P. (2017). Teach it to sustain it! environmental attitudes of Hungarian teacher training students in Serbia. Journal of Cleaner Production. 154, 255-268.

Martinez, C.P., Castaneda, M.G., Marte, R.B., Roxas, B. (2015). Effects of institutions on ecological attitudes and behavior of consumers in a developing Asian country: the case of the Philippines. International Journal of Consumer Studies. 39, 575-585.

Mei, N.S., Wai, C.W., Ahamad, R. (2016). Environmental awareness and behavior index for Malaysia. Procedia-Social and Behavioral Sciences. 222, 668-675.

Meyer, A. (2015). Heterogeneity in the preferences and pro-environmental behavior of college students: the effects of years on campus, demographics, and external factors. Journal of Cleaner Production. 112, 3451-3463.

Nunez, M.B., Clores, M.A. (2017). Environmental literacy of k-10 student completers. International Journal of Environmental & Science Education. 12, 1195-1215.

Nur Sabrina Mohamed, A. K., Karpudewan, M., & Annamalai, N. (2021). Moving beyond the one-size- fits-all model in describing the climate conserving behaviors of Malaysian secondary students. Sustainability, 13(1), 18.

Ofstad, S.P., Tobolova, M., Nayum, A., Klöckner, C.A. (2017). Understanding the mechanisms behind changing People's recycling behavior at work by applying a comprehensive action determination model. Sustainability. 9 (2), 204.

Ordinance 03 series of 2014. Sangguniang Panglungsod. General Santos City, Philippines. Available at: http://www.spgensantos.ph/sppo-no-2013-0924/ (Accessed 8 December 2017).

Orellana-Ríos, A., Pozo-Llorente, M.T., Poza-Vilches, M.d.F. (2017). Pro-environmental attitudes and teaching practice in secondary schools located in natural protected areas from the perception of students: the case of Níjar Fields (Almería -Spain). Procedia - Social and Behavioral Sciences.237, 1112 – 1118

Palmer, J. (2002). Environmental Education in the 21st Century: Theory, Practice, Progress and Promise. Routledge, New York, NY, USA.

Poškus, M. S. (2018). Investigating pro-environmental behaviors of Lithuanian university students. Current psychology, 37(1), 225-233.

Reyes, J.A. (2014). Environmental attitudes and behaviors in the Philippines. Journal of Educational and Social Research. 4, 6.

Ruepert, A., Keizera, K., Steg, L., Maricchiolo, F., Carrus, G., Dumitru, A., Mira, R.G., Stancu, A., Moza, D. (2016). Environmental considerations in the organizational context: a pathway to pro-environmental behavior at work. Energy Research and Social Science. 17, 59–70.

Sapuay, G.P. (2016). Resource recovery through rdf: current trends in solid waste management in the Philippines. Procedia Environmental Sciences. 35, 464-473.

Section 4: key informant interviews (n.d.). UCLA Center for Health Policy Research.Available at: http://healthpolicy.ucla.edu/programs/health-data/trainings/documents/tw_cba23.pdf (Accessed 8 December 2017).

Schaafsma, M., van Beukering, P.J.H., Oskolokaite, I. (2017). Combining focus group discussions and choice experiments for economic valuation of peatland restoration: a case study in Central Kalimantan, Indonesia. Ecosystem Services. 27, 150-160.

Schmitt, M.T., Aknin, L. B., Axsen, J., Shwom, R.L. (2017). Unpacking the relationships between pro-environmental behavior, life satisfaction, and perceived ecological threat. Ecological Economics. 143, 130–140.

Schwartz, S.H., Howard, J.A. (1981). Normative decision-making model of altruism. In: Rushton, J.P., Sorrentino, R.M. (Eds.), Altruism and Helping Behavior. Erlbaum, Hillsdale, New Jersey, USA, pp. 89-211.

Stern, P.C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. Journal of Social Issues. 56, 407-424.

Sumaylo, S.J. (2016). Green practices of accommodation and lodging establishments in the capital town of Siquijor province, Philippines. International Journal of Ecology and Conservation. 20,1.

García-Valiñas, M.A., Macintyre, A., Torgler, B. (2012). Volunteering, pro-environmental attitudes and norms. The Journal of Socio-Economics. 41, 455-467.

Varela-Candamio, L., Novo-Corti, I., García-Alvarez, M.T. (2017). The importance of environmental education in the determinants of green behavior: a meta-analysis approach. Journal of Cleaner Production. 170, 1565-1578.

Vicente-Molina, M.A., Fernandez-Sainz, A., Izagirre-Olaizola, J. (2013). Environmental knowledge and other variables affecting pro-environmental behavior: comparison of university students from emerging and advanced countries. Journal of Cleaner Production. 61,130-138.

Yu, TY., Yu, TK., Chao, CM. (2017). Understanding Taiwanese undergraduate students' pro-environmental behavioral intention towards green products in the fight against climate change. Journal of Cleaner Production. 161, 390-402.

Zakharova, E., Liga, M., Sergeev, D. (2015). Constructing philosophy of environmental education in contemporary Russia. Procedia - Social and Behavioral Sciences   214, 1181 – 1185.

Zsóka, Á., Szerényi, Z.M., Széchy, A., Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. Journal of Cleaner Production. 48, 126-138.

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Task	% of contribution of each author	
	A1	A2
A. theoretical and conceptual foundations and problematization:	60%	40%
B. data research and statistical analysis:	50%	50%
C. elaboration of figures and tables:	50%	50%
D. drafting, reviewing and writing of the text:	60%	40%
E. selection of bibliographical references	60%	40%
F. Other (please indicate)	-	-

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