FACTORS AFFECTING THE ENVIRONMENTAL CONSCIOUSNESS THROUGH USING PLASTIC-RELATED PRODUCTS OF UNIVERSITY STUDENTS IN HANOI

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Abstract

Environmental protection education is the responsibility of the whole society, especially in the university system. Although virtually all students have also recognized the harmful effects of environmental pollution on humans, the awareness of preserving and protecting the environment from the smallest actions is not the habit and regular action campaign of the country's future generation students. In this study, by examining students' behavior of using plastic-related products to pollute the environment of college students, the authors want to verify behaviors that directly or indirectly affect the environment. The authors conducted a survey with 454 representative samples of students from 15 private and public universities in Hanoi. In particular, this study also offers solutions and recommendations for universities to raise awareness of environmental protection.

Keywords: *Awareness of environmental protection, plastic waste, university students*

1. Introduction

Plastic waste is one of the causes of pollution to the living environment of people in the world and in Vietnam. In fact, plastic waste is discharged from construction sites, factories and especially from civil products serving people's daily lives. The use of plastic-related products brings many conveniences for life, contributing to reduce product costs, plastic-related items can be easily transported and distributed globally. This is reason why plastic waste is present all over the world. According to statistics of the Ministry of Natural Resources and Environment in 2020; on average, each household uses 1kg of plastic bags over a month; for the period from 1990 to 2015 the amount of plastic consumption in Vietnam has increased rapidly, from 3.8 kg/person/year up to 41 kg/person/year (Hiệp hội nhựa Việt Nam); Up to now, the average amount of plastic waste discharged into the market every day is 80 tons. Therefore, it is very important to raise awareness to help young people take specific actions to protect the environment. Studying the factors affecting the awareness

of environmental protection of university students through the use of plastic-related products is a message that the author wishes to contribute, propagate and support to protect our living environment.

Not only in Vietnam, but also in the world, there have been many environmental studies. According to the author (Yurttaş & Sülün, 2010), (Mert, 2006), the development of society such as urbanization, industrialization, modernization has caused pollution to the natural living environment, greenhouse effect, natural disasters, floods, epidemics, depletion of the ozone layer, extinction and weakening of plant and animal species useful for life on earth.

According to the author (Herrera et al., 2018) plastic waste with durable properties, difficult to destroy, from large pieces of plastic will break into very small plastic particles called microplastics, they are considered as microplastics. Environmental pollutants are found in all marine, freshwater and terrestrial ecosystems, in the ground, in the air. The abuse of plastic products along with a lack of awareness of environmental protection has become common and there is increasing evidence that plastic waste can cause adverse effects on the living environment of people. Some of the used plastic products are often contaminated with pathogens and must be disposed of as hazardous waste to avoid increasing pollution in the terrestrial and marine ecosystems. Waste management systems around the world have been unable to adequately deal with the existing plastic waste. That is why the increasing amount of waste today threatens the waste management system and challenges the global health system (Ardoin & Bowers, 2020). Therefore, educating the sense of using environmentally friendly products to gradually replace plastic products is essential in accordance with the world's trend to restore the ecosystem on earth. Doing this requires transformative actions in behaviors related to human production and consumption that reflect individual choices as well as large-scale collective action (Ardoin & Bowers, 2020).

According to (Zelezny and Schultz, 2000), (Corraliza, 2001) “awareness of environmental protection includes psychological factors related to individuals, it occurs when actions are based on groups of values, beliefs and regulations combined with an effort to reduce your negative impact on the environment”. According to the author (Grop, 1995) the awareness of environmental protection arises when emotions are associated with the realization that there are environmental problems often related to human behavior. According to the author (Hines et al, 1986), (Balwada et al., 2021) environmental consciousness was explored by four groups of factors; sociology includes age, gender, education level; awareness and knowledge of the current environmental situation; environmental and psychosocial interference through the expression of self-responsibility for their actions. According to the author's study on disposable plastic products consumption behavior in universities (Nguyen Thi Thanh Huyen et al., 2020) shows that students in universities from Da Nang and above are about 82.32% of the The students surveyed had a positive sense of limiting the use of plastic products once to protect the environment.

However, in order to perfect the study of environmental protection consciousness through the use of plastic products, the author would like to survey students from private, national and international universities. in Hanoi to help the author have a more holistic view in assessing the awareness of environmental protection against pollution from plastic waste.

To complete this study, the authors selected and applied behavioral theory and a planned research model of Ajzen (1991), inheriting on the basis of the studies of (Jones et al., 2013) and (Trang & Thao, 2018). Planning behavioral theory in which the intention to perform the behavior will be influenced by three groups of factors; attitudes toward behavior, subjective standards and awareness of behavioral control (Trang & Thao, 2018), (Chen & Yang, 2019). Based on the experimental research models Stanford (2006), Han et al (2010), Pipitvanichtham (2013), the author would like to propose a research model (Figure 1) with independent variables including: attitude, subjective standards, behavioral control perceptions, past experiences. The dependent variable is the intent to protect the environment through the use of plastic-related products.

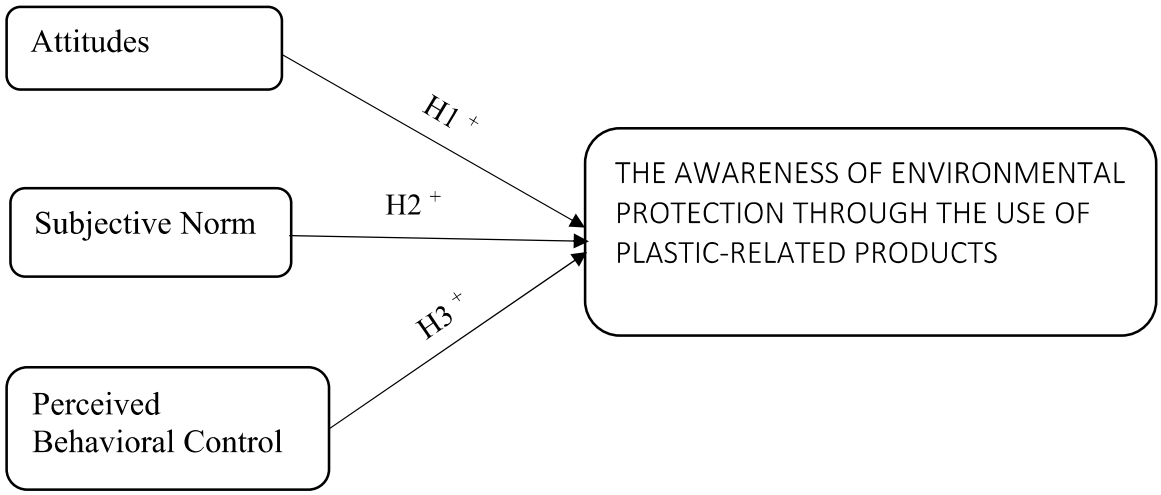

Figure 1: Proposed research model

(Source: Theory of planned behavior Ajzen,1991)

Research question:

H1: Attitude has a positive impact on awareness of environmental protection

H2: Subjective norm has a positive impact on awareness of environmental protection

H3: Perceived behavioral control has a positive impact on awareness of environmental protection

2. Method

The object of the study was determined to be the awareness of environmental protection through the student's behavior of using plastic-related products. In terms of space

and research subjects, they are students of private and public universities in Hanoi. The research sample was identified as 420 students in representatives of 10 private and public universities in Hanoi area. Content of the survey consists of 2 parts; personal information part to verify the reliability of the sample, the scale part to explore observed variables and factors. All this content is designed on servey monkey software with google drive app and QR code encoding. How to deploy the survey via email, Facebook, Zalo in 15 days, then extract it to excel, use SPSS software to verify the reliability of the factors and the correlation between variables, then regression to confirm the research hypothesis. The study period is 3 months from the time the research plan is received to the end.

To complete this article, the author uses a number of research methods; descriptive statistics, synthesis of descriptive statistics, quantitative research. In the review of research papers, the authors chose to refer to the publications in prestigious journals of the World Scientific Council, the journal catalogs on Scimago as the basis for this study. The research model building is based on the theories of planned behavior of Ajzen (1991). Using the Likert 5 scale with five answer options "totally disagree, disagree, hesitate, agree and completely agree" on the basis of consulting experts for the purpose of adjust the content fit of the observed variables in the factor so that it is most reasonable. Total 3 independent factors; AT (Attitudes), SN (Subjective norm); PBC (Perceived Behavioral Control) and dependent variable EA (Environmental protection consciousness through the use of plastic-related products). The observed variables of the independent variable are denoted: AT (AT1, AT2); SN (SN1, SN2, SN3); PBC (PBC1, PBC2, PBC3). The observed variables of the dependent variable EA are denoted (EA1, EA2, EA3, EA4, EA5).

3. Results

3.1. Description of the study sample

With a research period of 3 months of which the survey was conducted for 15 days. The number of votes issued was 420 votes, 420 votes were collected, of which 420 were valid, 0 was invalid. The percentage of valid votes accounted for 100%, the survey results are guaranteed according to the requirements set forth. The information to assess sample quality includes the name of the school, the major, the age, the year of the student, the results are listed as follows: 10 public and private universities in Hanoi, the number of students. students in a total of 20 different majors, the average age is about 20 years old, mainly first-year students, second-year students account for 64%, third-year, fourth-year and final-year students account for 36%.

3.2. Result of factor analysis

3.2.1. The reliability of the scale according to Cronbach's Alpha coefficient

Cronbach's Alpha coefficient of the dependent variable Consciousness (EA) is 0.914 and the correlation coefficient of the total variable is > 0.3, so the data has very good reliability (Hair và cộng sự, 1998).

Reliability Statistics

Cronbach's Alpha	N of Items
.914	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EA1	15.68	12.057	.770	.896
EA2	15.70	11.958	.802	.890
EA3	15.78	11.544	.863	.877
EA4	16.05	11.484	.765	.898
EA5	15.80	12.135	.707	.909

The reliability coefficient of the standard variables (SN) is 0.883 and the correlation coefficient of the total variable > 0.3 should have good reliability (Hair và cộng sự, 1998).

Reliability Statistics

Cronbach's Alpha	N of Items
.883	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SN1	8.31	3.421	.788	.820
SN2	8.30	3.460	.748	.855
SN3	8.06	3.404	.781	.826

Cronbach's Alpha coefficient of the Perception variables (PBC) is 0.885 and the total correlation coefficients > 0.3 should have good reliability (Hair và cộng sự, 1998).

Reliability Statistics

Cronbach's Alpha	N of Items
.885	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PBC1	7.90	3.410	.767	.845
PBC2	8.08	3.301	.756	.857
PBC3	7.76	3.434	.809	.810

Cronbach's Alpha coefficient of Attitude (AT) is 0.766 and the total correlation coefficients are > 0.3, so the scale has good reliability (Hair và cộng sự, 1998).

Reliability Statistics

Cronbach's Alpha	N of Items
.766	2

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AT1	3.35	1.074	.621	.
AT2	3.13	1.172	.621	.

3.2.2. Exploratory factor analysis (EFA)

The KMO coefficient is 0.863 > 0.5, so it meets the criteria for exploratory factor analysis (Hair và cộng sự, 1998).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.863
Bartlett's Test of Sphericity	Approx. Chi-Square	2022.260
	df	28
	Sig.	.000

The total variance extracted from the factors is 81.805%, showing that 80.273% of the variation of the data is explained by 3 groups of factors (Hair và cộng sự, 1998).

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.474	55.927	55.927	4.474	55.927	55.927	2.577	32.215	32.215
2	1.419	17.736	73.664	1.419	17.736	73.664	2.296	28.703	60.917
3	.651	8.141	81.805	.651	8.141	81.805	1.671	20.887	81.805
4	.404	5.044	86.849						
5	.306	3.825	90.673						
6	.284	3.549	94.223						
7	.249	3.109	97.332						
8	.213	2.668	100.000						

Extraction Method: Principal Component Analysis.

Rotation Matrix: The rotation matrix table shows the factors that have convergence and distinction. At the same time, the load factor of the factors > 0.5 should meet the criteria (Hair và cộng sự, 2015).

Rotated Component Matrix[a]

	Component		
	1	2	3
SN2	.834		
SN1	.823		
SN3	.813		
PBC2		.895	
PBC3		.788	
PBC1		.720	
AT1			.894
AT2			.880

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

3.2.3. Correlation Matrix

The correlation matrix table shows that the pairs of independent and dependent variables are all correlated at the 0.1% significance level. At the same time, no pair of independent variables has a correlation coefficient greater than 0.8, so there is no serious multicollinearity (Hair và cộng sự, 1998).

Correlations

		TC	NT	TD	YT
SN	Pearson Correlation	1	.742**	.304**	.734**
	Sig. (2-tailed)		.000	.000	.000
	N	420	420	420	420
PBC	Pearson Correlation	.742**	1	.256**	.790**
	Sig. (2-tailed)	.000		.000	.000
	N	420	420	420	420
AT	Pearson Correlation	.304**	.256**	1	.259**
	Sig. (2-tailed)	.000	.000		.000

	N	420	420	420	420
	Pearson Correlation	.734**	.790**	.259**	1
EA	Sig. (2-tailed)	.000	.000	.000	
	N	420	420	420	420

**. Correlation is significant at the 0.01 level (2-tailed).

3.2.4. Linear regression analysis by least squares (OLS)

The Durbin-Watson coefficient is 1,828 and lies within (1,3), so there is no autocorrelation. In addition, the adjusted R-squared coefficient is 0.671, showing that the independent variables explain 67.1% of the variation of the dependent variable.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.821[a]	.673	.671	.48808	1.828

a. Predictors: (Constant), AT, PBC, SN

b. Dependent Variable: EA

The P Value of the linear regression analysis is 0.000, so the model is statistically significant at the 0.1% significance level.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	204.291	3	68.097	285.858	.000[b]
	Residual	99.099	416	.238		
	Total	303.390	419			

a. Dependent Variable: EA

b. Predictors: (Constant), AT, PBC, SN

The estimated results show that the Pvalue coefficients of SN and PBC are both 0.000, indicating that Standard (SN) and Perception (PBC) have a positive impact on Consciousness (EA) at the significance level of 0.1%. Besides, the Pvalue coefficient of Attitude (AT) is 0.490 > 0.05, so Attitude has little impact on Consciousness at the 5% significance level. In addition, all variance exaggeration factors (VIF) < 4 should not cause serious multicollinearity (Hair và cộng sự, 1998). At the same time, PBC's standardized Beta coefficient is 0.545 > SN's standardized Beta coefficient is 0.324, so PBC's impact on EA is larger than SN.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.581	.127		4.571	.000		
	SN	.306	.040	.324	7.629	.000	.436	2.293
	PBC	.519	.040	.545	13.030	.000	.449	2.227
	AT	.018	.026	.020	.691	.490	.905	1.105

4. Discussion and Conclusion

Environmental protection is a very important action in the current period, especially for the young generation and students in universities. Based on the results of the study on factors affecting the awareness of environmental protection through the use of plastic-related products of university students in Hanoi, the authors would like to offer some discussion as follows:

Firstly, attitude (AT) is an important factor contributing to environmental protection, however, in this study, there are only 2 observed variables in the factor that have the strong influence on awareness of environmental protection. According to the author (Creswell, 2009) the difference in language, meaning in observed variables for different research environments can be accepted in a factor with 2 observed variables. In fact, in this study, attitude (AT) has an influence on Environmental Awareness (EA), but compared with the other factors, it is not high. Therefore, the author would like to share his opinion as follows: Sometimes we have a good attitude in protecting the environment, but the actual objective conditions, the current social environment does not meet the needs, For example, the majority of students "have a habit of using plastic-related products", and they think that using "plastic-related products is very convenient in life". The problem here is to change habits by

educating awareness, propagandizing, launching campaigns and providing eco-friendly alternatives, orienting new consumption habits with reasonable prices. If so, the attitude towards environmental protection consciousness will have higher results.

Secondly, the subjective norm factor (SN) has a strong impact on the awareness of environmental protection (EA), through the observed variables, we see the average value of SN: 4.111 (SN1: 4.0261; SN2: 4.0357; SN3: 4.2714). Most of the students support environmental protection by using alternative products, or support people to use substitutes for plastic-related products; According to survey statistics, 78% agree and completely agree, 16% are confused and 6% disagree with the above opinion. Regarding the idea of limiting the use of plastic products, 78% said that it is a good behavior to protect the environment; 14% are confused and 18% disagree. For the collection and classification of plastic waste, 85% agree, 8% are confused and 7% disagree.

Thirdly, the perceived behavioral control factor has the strongest impact on the awareness of environmental protection through the use of plastic-related products. According to the research results, among all the regression coefficients Beta, the independent variable PBC has the largest value of 0.545 compared to other factors.

Raising individual awareness about environmental issues and changing the behavior of using plastic-related products will contribute to a better living environment, reducing pollution and indiscriminate waste discharge into the environment. Therefore, students need to fully absorb information related to environmental issues. Along with the most practical actions such as participating in campaigns to collect and recycle waste to protect the environment. Propagating and spreading the value of raising awareness of environmental protection. Students can actively choose to use environmentally friendly organic products. This is also a good opportunity for businesses and organizations in society to develop environmentally friendly substitutes, orient new consumption habits by applying advances in biodegradable polystyrene and Prospective solution for plastic waste pollution. Faced with these realities, the Vietnamese government, the Ministry of Natural Resources and Environment, the Ministry of Health, agencies and social organizations have adopted policies and propaganda activities on preserving and protecting the living environment through specific actions such as waste segregation, use of alternative products, campaigns to clean up the environment. Especially control the implementation of the environmental protection law for organizations and individuals living and working in the territory of Vietnam. Having policies to attract and promote businesses to develop environmentally friendly substitutes in order to promptly meet the demands of life for consumer goods

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