


Article

Environmental Education and Student's Perception, for Sustainability

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Abstract: Environmental education and education for the environment today play an important role toward sustainability. Environmental education provided by higher education institutions has an important impact on training and preparing the future generation for a green society. The purpose of this study is to examine the relationship among perception, attitude, and environmental behavior of the university students enrolled in different specialization fields (engineering electrical, mechanical, and economic). A total of 358 students participated in this survey conducted at the North Center University of Baia Mare. To collect data to measure students' environmental education, perception, students' attitudes, and behavior a Likert scale was used. In this study, it was revealed that students receiving academic education are involved in activities regarding environmental protection (volunteer, warning, participation, recycling of materials) using the new product and "greener" alternative energy. As a result of the t-test performed, it was put forward that there was no difference in their level of perception regarding the importance of environmental education. As a result of the correlation analysis, a positive relation was identified between the perception, attitude, and behavior variables.

Keywords: environmental education; education environment; attitude; behavior; sustainability

1. Introduction

The first environmental initiatives appeared about 200 years ago due to the need to rescue endangered species. Over time, reasons that have imposed nature protection have diversified. Since 1970 there have been clear signs of planet deterioration: Thinning of the ozone layer, global warming, acid rain, and water, air, and soil pollution. People began to understand the need to behave more responsibly towards nature, but the responsibility of man for the protection of the environment is both individual and above all collective: Nature protection engages mutual collaboration and support on the ground, local, county, national, and especially, international levels. Literature about environmental education (EE) defines it in multiple ways and, for the purposes of this research, we understand EE to be a collaboration of content and pedagogy that engages students in a study of the environment to "encourage behavioral change and action" [1].

In a UNESCO study from 1985 [2], it is shown that students from several developed European countries have attitudes towards the highly developed environment, but the inclination to act to solve environmental issues or to be active in environmental organizations is very low.

The rift between the rich ecological awareness of many citizens and lack of involvement in practical environmental protection activities can be overcome by changing the ratio of the share of knowledge to that of practical environmental activities in favor of the latter and through the priority use of specific methods of moral and civic education (method-specific example of educators, eco ethics

debate, case analysis, moral conversation, exercise, team co-operation, moral punishment positive or negative, etc.). According to UNESCO [3], in 1987 environmental education was considered as a learning process that enhances people's knowledge and skills about the environment and the associated challenges, which develop the necessary skills and expertise needed to meet challenges and foster attitudes, motivations, and commitments to inform decisions and take responsible actions (definition also used in 2015 [4] and adapted with the new society orientation).

According to the Tbilisi Declaration [5], environmental education is a process aimed at developing a world population that is aware of and concerned about the whole environment and its associated problems and which has the knowledge, attitudes, motivations, commitment, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones [6,7]. Environmental education, as supported by Crohn Kara and Birbaum [8], has been around for over 50 years and has contributed to environmental sustainability by disseminating skills-building information. The assessment of environmental education [9] suggests it is rather poor, despite several decades of attention to its importance and the assessment discipline has a short history of environmental education.

Shubo Liu and Liqing Guo [10] are among the authors who have paid more attention to environmental education or environmental issues in management education. They expected people to enrich their environmental and ecological value through ecological education, thus changing people's attitudes.

In 1992, for the first time, an international survey conducted by the George H. Gallup International Institute obtained data on a wide range of environmental perceptions and opinions from citizens in 24 economically and geographically diverse nations [11]. Aggregate, national-level scores for a variety of measures of public concern of environmental quality were created and correlated with per capital national product. Although the results vary considerably depending on the measure, overall national affluence is more often negatively rather than positively related to citizen concern for environmental quality—contradicting conventional wisdom [6].

Global concern for the environment and planet health represent, for Dunlap and Mertig [12], a priority taking climate change, the increasing CO₂ footprint, and the reaction of nature against human impact into consideration.

Volunteering in the field of environmental protection and preservation is one of the synthetic criteria for assessing the efficiency and effectiveness of ecological education activities.

Environmental education by volunteering is the ideal of ecological education globally; volunteering is rare, with less than 1% of the population taking part [8], except for countries such as the Netherlands, Denmark, Great Britain, USA, Canada, Australia, etc., and in the European Union the percent is 4% (European Commission) [5].

Riordan and Last [13] applied a survey to identify students' responses to environmental issues through action, which remain a key area for study. The energy incited by this study was evident in their work, their willingness to talk with researchers informally about their learning, and in the actions they undertook to spark transformation. The results reflect that in our shrinking world, sustaining the environment relies on students becoming problem-solvers, critical-thinkers, and ultimately, change-makers. There is much debate about whether the foundation of environmental education (EE) is a part of Education for Sustainable Development (ESD), whether ESD is a part of EE, or whether the two must be considered as separate entities [14,15].

Schultz [16] in 2002 gave an answer to the question regarding influences of the types of attitudes that individuals within a given culture are likely to develop, the types of environmental behaviors that individuals are likely to adopt, and more generally, beliefs about how to solve environmental problems. Protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made regardless of cost. By transferring the European attitude toward environment Eurobarometer across cultures [17] to Romania in 2009, Nistor [18,19] made a study about the Romanians behavior regarding the nature and their positive

attitude towards the environment. The attitude of the Romanians is similar to the Europeans towards the environment, the relationship between ecology and consumer behavior. The same factors are influencing the behavior of students, namely their attitude to the environment and to the problems related to it such as climate change, the need to reduce greenhouse gas emissions and to use alternative energy, pollution, loss of biodiversity, more efficient use of natural resources, waste management, sustainable consumption, and impact of products on the environment.

The current ecological crisis spreads freely on our planets, affecting the unacceptably long biosphere and, implicitly, the living environment. Realizing the huge scale of this phenomenon, decision-makers of world rank and lately, nationally, are trying to establish firm and urgent measures for saving nature, for the preservation of the human environment; measures that are also covered by the education system.

Sauvé [20] underscores the concept of sustainable development and has associated with environmental education to promote development models based on the wise use of resources, with concerns for equity and durability [21]. Environmental education, regardless of the manner in which it is connected to sustainable development, must face its own limits. Different conceptions of environment, education, and sustainable development coexist. These conceptions influence the way educators define and practice environmental education.

In his study, Biedenweg and Monroe [22] sustain that environmental educators are joining forces with youth and community development professionals, museums, zoos, and botanical gardens and urban green space managers and planners to come up with new practices that reflect societal concerns. Many of these practices occur outside of the classroom, involve youth and elders working together, and engage a diversity of professionals and participants in urban, as well as suburban and rural communities.

Jadhav et al. [23] and Raut [24], in their study about the role of the higher education institution from India in environmental conservation and sustainable development, conclude that universities can help to establish sustainable development through the following aspects: Teaching programs, research, and outreach. As environmental sustainability is becoming an increasingly important issue for the world, the role of institutions of higher education in relation to environmental sustainability initiatives is becoming more and more prevalent [25].

Almut Beringer [25] concluded that if the role of colleges and universities is to educate members of society, then they must be actively instrumental in the sustainability movement.

Arjen and Wals [26] explain the need of environmental education which is obviously related to nature conservation education; however, there is an important difference in that it transcends issues of nature, biodiversity, and ecology to also, and foremost, include issues of environmental degradation, environmental health, pollution, and so on that have a lot to do with the way we live, produce, and consume.

Biplab Roy [27] and Rajidul Hoque [4], in their study about environmental education and sustainable development in Bangladesh, mention that this topic has been a recent phenomenon which is necessary not only to develop sustainable environment but also to fight with upcoming climate change.

The aim of environmental education is to teach and educate the public about the function of natural environments and, particularly, how human beings can manage their behavior and ecosystem. Akinci et al. from Turkey [28] understood that in order to ensure the sustainability of education in the direction of the findings obtained, besides fulfilling the expectations of the economic sector, it is very important to determine and fulfill the expectations of the education students.

Instead, Zsoka et al. [29,30] argue that environmental education based on a sustainable environment focuses on knowledge of the environment, environmental attitudes, and environmental skills. Moyo and Masuku [31] examine the goal of environmental education of recent societal people with their knowledge and awareness about the environment and the solution of adaptation to encourage green behavior.

Environmental education emphasizes that knowledge, attitudes, and abilities are related to the environment, and through the developed education, the foundations of a sustainable environment are established. Zsóka et al. [29,31], Richmond [32], state that environmental education is based on sustainable environmental focuses on environment knowledge, environmental attitudes, and environment skills where environmental knowledge refers to the knowledge and awareness about environmental issues and solutions.

Azlinawati et al. [33] have studied ecological education in Malaysia and have identified the elements of environmental education in the environment and the environment in which teaching and learning methods apply.

Widening the vision of Azlinawati et al. [33] and Dymont et al. [34] and Rickinson et al. [35] established the relationship between ecological education and outdoor education, which has the role of shaping positive behavior and appreciation of students in terms of environmental growth, attitudes towards science and ecological behavior, and the establishment of close ties with real nature. This kind of ecological education provides a way for students to see, feel, and touch things around them and discover them in relation to nature. Other benefits of outdoor education have been identified by Bell and Dymont [36], namely developing the intellectual, physical, moral, and social aspects of students in relation to nature in green schools for outdoor learning. Also, a new vision regarding the impact of ecological school has been reported by Dymont et al. [34] and Zsóka et al. [30]; in their opinion, this kind of green school helps pupils' involvement and creativity by enhancing the learning process on green fields, compared to in-house learning, and enables them to develop their knowledge, skills, and attitudes towards the environment.

Another point of view on environmental education was supported by Pandit, Dhakal, and Polyakov [37] and in the results of their research, they demonstrate the positive correlation between the three elements of ecological education, environmental knowledge, and ecological value. In contrast, Ugolini et al. [38] and Pelegrini [39], propose a new ecological education for the environmental education taking into account the new generation of Facebook users and the impact of computers on new gaming styles by teaching simulation games, a kind of re-education of the environment with educational activities that helps students to be involved in the simulation of ecological education situations and to help them to meet the needs and applicability of solutions in real life in different situations. Ardoin [40] proposed digital photography and journaling in the evaluation of field-based environmental education programs for students' development of attitude and environmental behavior. Elnashaie [41] propose and encourage the research of environmental education with direct application to engineering, chemical, and material fields to improve the industrial domain and ensure sustainability education for a new green market. Applying virtual reality and the possible effects of environmental education can also stimulate students ethical attitude, a topic under research for Liu et al. [42] and the effects of environmental education.

Although the definition given by Lucas [43,44] has so far been current, claiming that environmental education is a holistic education that is about, in, and for understanding the environment from many perspectives, in time with the evolution of society, a new direction has been proposed. The challenge of the 21st Century has brought new insights into this area, and Scott and Vare [45], following an analysis of environmental education in schools in England, believe that environmental education is an opportunity that "seeks to develop an understanding of the relationship between human culture and our support system of life and accentuates the environment through social action and personal behavior."

In his studies, Franzen [46] suggests that faculty members need to identify gaps in ecological education and be more involved in identifying, developing, and implementing methods to ensure the development of students with competencies in ecological education as the future generation and future citizens.

Environmental education [47] is an opportunity for educational institutions to try to develop and contribute to the understanding of the relationships between human culture and human life, individual responsibility and society towards the environment, and the social action of personal behavior.

Zsóka et al. [30] consider that education for the environment has a significant influence on ecological awareness, adaptation of everyday lifestyle, and modeling of consumer behavior. Moreover, higher education institutions have recently recognized the importance of integrating sustainability aspects into education in order to make this impact focused and explicit.

While the theoretical framework 'education about, in, and for the environment' is based on Lucas [43] theory, Pavedis Chi and Viga de Alba [48], in their study about the Mexican curriculum, present the importance of environmental education as a key element that must be implemented because it is not enough for students to learn about environmental problems, is also necessary to know the causes, what the consequences of these problems are, and to learn how to help and identify possible solutions.

The environmental education refers to educational activities or programs that take place outside the classroom—namely in the physical environment that is the object of study [46–48]; this kind of education expects constant environmental efforts to protect the environment.

Zhang et al. [49] modeled the benefits of environmental education on tourism including the effects upon students and positive perception of environmental education on ecological tourism, touristic destinations activities which can change the will, skills, and behavior of tourists who participate in environmental protection and improve the impact of environmental education on tourism.

Ramirez [50] identified the importance of students' role as leaders, addressing their initiatives, activities, and the promotion of environmental education and protection. Young people are one of the most promising sectors of the society, they can be the promoters of change. Involving young people as environmental advocates can be a successful implementation of environmental protection. In the meantime, environmental education must include students as visionaries and creative thinkers.

Spira [51] mentions students are agents of change and are part of sustainable development's effects and it is time to transform the student's potential into action. Levin [52] mentions that universities must put students at the center of their activities for environmental education because students are producers of universities outcomes and their involvement is fundamental to all improvement [48–52].

The impact of the young generation in environmental education and universities become green participants taking into consideration the impact and effect of the following elements [53],

- Students represent a significant percentage of the young generation;
- Each country is vulnerable to disasters and degradations;
- The young generation, as new citizens, will inherit the responsibility of protecting the environment;
- They are already educated in and for the environment to be capable to educate others about the environment;
- They are the IT generation and fast communication and dissemination of information is their normal way of living.

Additionally, Wallner [54] mention that universities must be focused on sustainable development and involve them in different activities to develop student's perception, attitude, and behavior.

Environmental education is an important pillar of sustainable education because it is at an early stage of innovation that directly or indirectly involves universities through their role in measuring and maintaining the necessary conditions to maintain a balance between the dynamics of humans and nature. The other sustainability pillars are people, planet, and profit. Through the combination of these elements, sustainability can be successful as a function of people's ability (university, students), planet-environmental education, and profit—a green and healthy environment for generation [55].

Motivation of the Study

If we create a SWOT Analysis for Environmental education in Romania we can identify the strong and weak elements such as:

Romania is one of the countries with the largest biodiversity in Europe. It holds one-third of the Danube and half of the Carpathian Mountains. Of the nine bio-geographical regions of Europe, five are found on the surface of our country. All these data make Romania a country of an extremely rich and varied nature. We often hear that we have a beautiful country, but do we really realize Romania's importance at a European level and not only?

Do we really realize how important and unique our nature is? Here are some things that you may not know about Romania and which will help you understand that nature must be respected and protected. The diversity of our country is given by the confluence between the Danube, the Carpathians, and the Black Sea. This geographic position makes Romania have, within its territory, no fewer than five bio-geographical regions, among the nine existing at the European level. Romania is the country with the most bio-geographical regions in Europe [56].

The Danube Delta is certainly the most valuable natural wealth of the country. It is the largest wetland in Europe and has one of the largest biodiversities in the world, over 5000 species.

In the Delta, there is the largest compact reed area in the world and over 300 species of birds, more than half of the species present in Europe. The Carpathians stretch about 1000 km and form the second mountain range in Europe after the Scandinavian Mountains. They have a varied ecosystem, hosting over 13,000 species of plants and animals, including the largest population of large carnivores (wolf, bear, and laughter) in Europe.

Romania holds almost 65% of the virgin forests of Europe (except Russia), and this valuable resource is a habitat that is so necessary for the conservation of the species that depend on such a biotope. Another valuable resource is meadows, especially those in Transylvania, a habitat that has almost disappeared in the rest of Europe [56].

Maramures County's weak point is even it is under the UNESCO protection in the last few years was after a series of ecological disasters; Polluted rivers, an increasing CO₂ footprint, a polluted region because of the golden factory, the pollution of the city river Rivulus Dominarum (Ladies river) have challenged authorities to solutions and warnings about future possible phenomena. Human involvement and the formation of the Green Guard have led to the prevention of harmful phenomena and the education of citizens [57]. The threats for Maramures County are the goals in environmental education EE, ignorance of the young generation, and the lack of interest of students to be involved in activities to protect and prevent the damage of nature. Also, following the new international standards regarding the protection of environment, ISO 14001, the new generation and society must find new methods to identify instruments and modern tools to keep, maintain, and preserve the environment.

This study aimed to be an opportunity to determine the views of Romanian students from Technical University Cluj Napoca after undergoing environmental education, their attitude and satisfaction after coming to their views, and their behavior in front of education for the environment.

In this context, the main purpose of the research is to determine the direct and indirect perception, warnings, and how much they involved in environmental protection in volunteer activities on a local and regional level.

2. Materials and Methods

Taking into consideration the literature and research, the study was necessary because we want to know what students from Romania should know, what they should be able to do in their daily activities, and their behavior in and toward the environment. For that reason, the survey structure is as follows: Individual environment, external environment, and social environment and has 31 questions and four factors to identify the students profile and characteristics. In total, 358 students enrolled in North Center University of Baia Mare, Romania gave feedback regarding environmental perception and implication, attitude, and their environmental behavior.

The survey created to collect the research data comprised four sections. In the first section, we try to identify the personal information and characteristics using four questions (gender, age, student level of education, and family education); in the second section, we try to measure students' perceptions (A1–A20 questions); in the third section we try to identify students' environmental attitude (volunteer, protection nature activities, warning) and their perception regarding the recycling phenomenon (B1–B4 questions); in the last section, students answer the questions on their concerns about environmental behavior, providing feedback on environmental education (C1–C7 questions).

To obtain more information about the influence of environmental education between students, we re-organized the 35 questions as a function of seven variables which can measure the environmental behavior and attitude.

2.1. Sample and Measurement Tool

To measure the student's environmental education, a Likert-scale-type questionnaire, ranging from 1 'not agree' to 5 'totally agree', was applied on a face-to-face basis. To determine the dimensions of environmental education and identify students' implication, behavior, and commitment, an Explanatory Factor Analysis (EFA) is applied to the data set. By independent samples *t* test, the hypotheses were tested using the SPSS statistical analyses software. The Lisrel 8.7 program was used to establish the connection and correlation between variables.

2.2. Purpose of the Study

A quantitative research method was used in this research. In the style of research hypotheses, a structural equation model was used to determine the relationship between perception, attitude, and behavior variables.

The study was focused on the students' environmental perception and how their attitude toward environmental education influenced their behavior, see Figure 1.

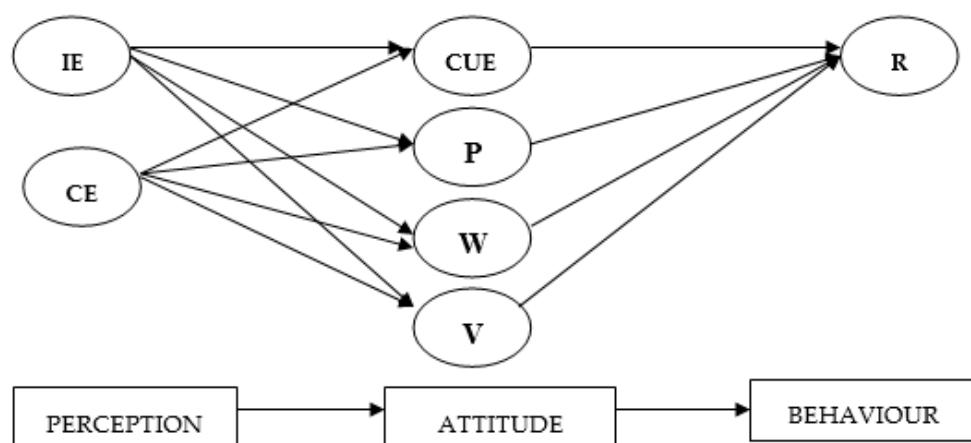


Figure 1. Research model. Source: By authors.

The model shows the direct and indirect relationship between the research variables (IE, CE, CUE, P, W, V, R). Additionally, the demographic variables (age, gender, family education) were included.

The research model from Figure 1 is based on the research objectives and hypothesis, as well as other research in the literature [58].

In this study, the following factors were taken into consideration:

1. IE—importance of environment (IE1, IE2, and IE3);
2. CE—concerns about environment (CE1, CE2, CE3, and CE4);
3. CUE—culture environment (CUE1, CUE2, and CUE3);
4. P—participation in different activities regarding environment;

5. W—warning attitude regarding environment (W1, W2, and W3);
6. V—volunteering activities, non-harmful actions (V1, V2, . . . , V9);
7. R—reuse 3R's (R1, R2, R3, and R4).

The study investigates the environmental behavior of university students and the causal relationships between their perception and attitude toward the environment and environmental behavior using a Structural Equation Model (SEM) which takes into consideration the environmental importance and concerns about the medium.

Twelve hypothesis tests are envisaged in the research model. The hypotheses tested in the present study are as follows in Table 1.

Table 1. Hypotheses tested by the attitudes of students.

H₁	<i>Perceptions of the students about the importance of environment have a significant effect on their attitudes about their culture.</i>
H₂	<i>Perceptions of the students about the importance of environment have a significant effect on their attitudes about their participation.</i>
H₃	<i>Perceptions of the students about the importance of environment have a significant effect on their attitudes about their warning.</i>
H₄	<i>Perceptions of the students about the importance of environment have a significant effect on their attitudes about their volunteer.</i>
H₅	<i>Perceptions of the students about the concern of environment have a significant effect on their attitudes about their culture.</i>
H₆	<i>Perceptions of the students about the concern of environment have a significant effect on their attitudes about their participation.</i>
H₇	<i>Perceptions of the students about the concern of environment have a significant effect on their attitudes about their warning.</i>
H₈	<i>Perceptions of the students about the concern of environment have a significant effect on their attitudes about their volunteer.</i>
H₉	<i>Attitudes of students for Culture have a significant effect on their Reuse behavior.</i>
H₁₀	<i>Attitudes of students for Participation have a significant effect on their Reuse behavior.</i>
H₁₁	<i>Attitudes of students for Warning have a significant effect on their Reuse behavior.</i>
H₁₂	<i>Attitudes of students for Volunteer Perspective have a significant effect on their Reuse behavior.</i>

2.3. Reliability and Validity of Scales

Cronbach's alpha reliability analysis was used to measure the environmental reliability of the scales used in the study, which were perceptions of academic education, their environmental education attitude, and their behavior with regard to environmental education scales.

The Cronbach's α coefficient was found to be 0.863 in the general validity and reliability analysis of the scales. As seen in Table 2, it was used to assess the reliability of the scale, and items with low-reliability scores were omitted.

Table 2. Standardized parameter estimate values, t values, and hypotheses.

Hypotheses	Paths	Standardized Parameter Estimate Values	t Values	Results
H1	(IE)→(CUE)	0.19	2.36	Confirmed
H2	(IE)→(P)	0.02	−0.20	Not Confirmed
H3	(IE)→(W)	0.36	4.46	Confirmed
H4	(IE)→(V)	0.36	4.74	Confirmed
H5	(CE)→(CUE)	0.85	8.34	Confirmed
H6	(CE)→(P)	0.79	8.39	Confirmed
H7	(CE)→(W)	0.79	9.49	Confirmed
H8	(CE)→(V)	0.74	8.48	Confirmed
H9	(CUE)→(R)	0.17	1.28	Not Confirmed
H10	(P)→(R)	−0.13	−1.24	Not Confirmed
H11	(W)→(R)	−0.03	−0.26	Not Confirmed
H12	(V)→(R)	0.53	4.96	Confirmed

After reliability analysis, exploratory factor analysis (EFA) was applied, and the structural equation model (Table 3) was developed after removing items which had factor loadings lower than 0.45.

Table 3. Goodness of fit indices for the structural model.

Criteria	Perfect Fitness	Acceptable Fitness	Model
RMSEA	$0 < \text{RMSEA} < 0.05$	$0.05 \leq \text{RMSEA} \leq 0.10$	0.055
NFI	$0.95 \leq \text{NFI} \leq 1$	$0.90 \leq \text{NFI} \leq 0.95$	0.92
NNFI	$0.97 \leq \text{NNFI} \leq 1$	$0.95 \leq \text{NNFI} \leq 0.97$	0.95
CFI	$0.97 \leq \text{CFI} \leq 1$	$0.95 \leq \text{CFI} \leq 0.97$	0.95
GFI	$0.95 \leq \text{GFI} \leq 1$	$0.90 \leq \text{GFI} \leq 0.95$	0.87
AGFI	$0.90 \leq \text{AGFI} \leq 1$	$0.85 \leq \text{AGFI} \leq 0.90$	0.85

Source: Schermelleh-Engel and Moosbrugger [59]. Where RMSEA: Root Mean Square Error of Approximation, NFI: Normed Fit Index, NNFI: Non-Normed Fit Index, CFI: Comparative Fit Index, GFI: Goodness of Fit Index, AGFI: Adjusted Goodness of Fit Index.

3. Results

Using the database of respondents' answers, the program solution presents the following results, shown in Table 4.

The feedback of information, using the fast communication of the 21st Century, is very rapid and has an important influence by sharing news, solutions, and advice to students to improve their education for the environment.

That's why the variable culture environment (CUE) is increasing and, at the same time, the behavior regarding the reuse R is increasing (green letter, 3R's, eco-products, driving an electrical car, bike, etc.).

For the factor concerning environment CE—we identify concerns about the environment by observing young people's perception of the environment and protecting it, awareness of this problem, the attempt to instill environmental care, our own concern for the future, and the realization that very few young people emphasize their health or the health of the environment they live in.

Table 4 presents an analysis of the dynamic influence of variables importance and students' concern about the environment and their participation in environmental problems.

Table 4. Results of explanatory factor analysis.

Factors		Loadings	Eigen Values	% of Variance	α
IE	Importance of the Environment				
IE1	I believe environmental issues are being exaggerated	0.734			
	I never have serious concerns about issues like water		1.061	6.117	0.547
IE2	I never have serious concerns about issues like marine pollution	0.688			
IE3	I don't believe that the extinction of animals and plants will destroy the World	0.618			
CE	Concern about the Environment				
CE1	I am concerned about the effects of air pollution on my family	0.795			
CE2	I am concerned about effects of air pollution on me	0.725	1.806	9.353	0.788
CE3	It's annoys me to see that factory wastes cause environment pollution	0.726			
CE4	Environmental pollution worries me	0.615			
	I am afraid that environmental pollution will make the world an uninhabitable place				
CUE	Culture Environment				
CUE1	I will check and switch off unnecessarily used lights	0.786	1.138	6.307	0.601
CUE2	I will use the back of papers when I am studying	0.757			
CUE3	I will warn those polluting the nature	0.388			
P	Participation				
P1	I will not directly and indirectly harm environment with economic concerns in my business and private life	0.803			
P2	I will show no violence and aggression towards the environment	0.570	1.212	6.630	0.616
P3	I live in and what is inside it				
	I will do my best to make the environment I live in more livable	0.547			

The factor P participation attitude of students toward environmental protection is improving but, at the same time, their behavior is deteriorating. The results give us an image regarding students' information, about their self-implication in daily events which can help or harm the environment. Today mass-media (TV, radio, newspaper, internet, etc.) present environmental problems, the natural impact and the influence of people actions against the environment in an aggressive way.

Another variable of the study volunteer (V) activities among students has a positive impact upon 3R's significance and development of the specific behavior of students but their attitude remains poor. The student's qualities of personality as true volunteers reflect traits of will: I will be, I will work, I will take part, I will use and character, ethical, and civic qualities of personality, like those given in Table 5.

Table 5. Results of explanatory factor analysis regarding the volunteer attitude.

Factors		Loadings	Eigen Values	% of Variance	α
V	Volunteer				
V1	I will be an actively involved member of nature and environmental organizations like mention it	0.730			
V2	I will work on a voluntary basis for nature and human beings	0.718			
V3	I will take part in tree-planting activities	0.660			
V4	I will take part in environmental cleaning campaigns	0.658			
V5	I will take action on nature polluters with the local authorities	0.599	7.159	12.692	0.831
V6	I will set aside the wastes of products consumed for recycling	0.600			
V7	I will use products produced from non-renewable resources like underground oil, coal, natural gas, and mines in an economical manner because we will be unable to replace them with new resources	0.445			
V8	I will make noun necessary consumption to make sure pollution is eliminated at its source	0.444			

As a major factor, the role of volunteer could help maximize results of student volunteers' work in the field of the environment, the respondents consider that the will and the strong motivation to do good to the people and the protection of the community environment are attached to moral values; high-level civics in the sense of duty, respecting the moral and legal norms of the relationship between man and environment promoting the interests of the collective, as a matter of priority to society.

The most relevant product of organic education is the personality of the volunteer who is involved in solving environmental problems. Volunteering has grown since the 1970s, especially in the latter two decades, starting with the US, Canada, Australia, and countries in the European Union and others, being marked by the green policies implemented by governments, by the progress of ecological education in systems national education, in various environmental, media, and media organizations.

The universities without the formation of ecological dimensions of the personality of contemporary man, without the appropriation of ecological culture based on positive attitudes toward the environment and to the person's belief in sustainable development, in the possibility of a real "green society" edifice and human rights attachment to a healthy and balanced environment. Regarding the ecological personality of the respondents, they engage in voluntary organizations and activities to acquire positive, stable attitudes towards the environment.

The students claim that training beliefs and attitudes towards environmental issues arise not so much from training but the formation of ecological consciousness, and especially, from the organization of environmental protection activities, practical applications.

Warnings (W) about the environment are increasing but the students' behavior score is decreasing even when they know the negative impact associated with activities in their daily routine such as waste water, pollution of the air, garbage, waste energy, waste paper, harming trees and parks' flowers, see Table 6.

Table 6. Results of explanatory factor analysis regarding the warning.

Factors		Loadings	Eigen Values	% of Variance	α
W	Warning				
W1	I will warn those harming trees and flowers in parks and gardens	0.744	1.505	6.679	0.627
W2	I will warn those in my immediate vicinity to refrain from any unnecessary consumption	0.709			
W3	I will fight those endangering the nature	0.532			

From university students 40% percent are members of different organizations' NGOs (Non governmental organizations) which are doing activities to encourage the young generation to protect and preserve the environment by: Cleaning the river Sasar (Rivulus Dominarum—latin name), cleaning the central park Queen Mary of the city, and expeditions in the protected area of Maramures County Mountains that are organized with the involvement of high school and university students. According to the factor R-reuse, recycle, reconversion, see Table 7, the new green life for this century, brings the necessity for harmonization with the international standards, especially, with ISO 14001. The new direction of the market, adaptation with healthy eco-bio-green products, encourages the young generation and redirects them towards a new lifestyle and behavior.

Table 7. Results of explanatory factor analysis regarding the reuse.

Factors		Loadings	Eigen Values	% of Variance	α
R	Reuse				
R1	I am buying ecological products although they are more expensive	0.833	2.534	10.846	0.829
R2	I am buying products with recyclable packaging	0.825			
R3	I am buying the products of companies backing environmental projects	0.742			
R4	I prefer using products produced from renewable raw materials	0.701			

The results for the most important actions regarding the R-reuse are the following: For R1, a value of 0.833 is the highest value obtained because the green and ecological products, even though they are expensive, are preferred by people because they are biological and healthy. In recent years, Romania introduced a program to encourage Romanian products named "Made in Romania" to educate customers to buy products produced in Romania and encourage a market demand. As we can see, the program was successful because the Romanian market has not yet been conquered or invaded by modern technology and, in agriculture, we are not using chemical products. For R2, the results are as high as 0.085, knowing that being in the EU we must harmonize the market and products with standards of quality, following the standards on the products with regard to specific types of packaging. In conclusion, students know the specific place and the modality of recyclable packaging for paper, plastic, or steel. Regarding R3 and R4, the results are lower. This may be because it is new on the market and the organizations are not responsible regarding environmental problems and are not yet involved in environmental education. The re-orientation of organizations to change their role from not only a producer but also an educator is only beginning, and finally, students with information are encouraged to buy from these types of producers. The last R4 is important because we consider paper and plastic selection necessary but the lowest results between students' environmental behavior present the Romanian reality. Even in the Romanian market, since 2018, we have introduced the new ecological bag, but we don't have the infrastructure for products from renewable raw material yet.

As we can see from Table 8, environmental students attitude obtain a higher value 4.1136 in comparison with behavior 3.4839, that means they are deeply involved in different activities to protect nature.

Table 8. The importance of factors.

Factors		Mean	Std. Dev.
IE	Importance of Environment	3.1899	0.94639
CE	Concern about Environment	4.2102	0.60662
CUE	Culture Environment	4.1806	0.56698
P	Participation	4.3454	0.53931
V	Volunteer	3.8994	0.59601
W	Warning	4.1490	0.64205
R (Behavior)	Reuse	3.4839	0.82942
Perception		3.7001	0.54471
Attitude		4.1436	0.43513

The students' perception score regarding the environmental problems and importance of nature for life is higher but the behavior score is lower because they consider that the aggressive mass-media information about environmental problems, maritime disaster, and pollution as an environmental issue are exaggerated and are not important to them.

Correlations between Items

Transferring the database and using the Lisrel 8.7 program, it was possible to model and establish the correlation between concerns about environment (CE), culture environment (CUE), warning (W), and volunteer (V), as we can see from Figure 2.

The values are positive and the strongest connection exists between concern and culture environment with a value equal to 0.86, and the lowest value of -0.01 is between environmental concern and their desire to practice volunteer activity, V. The concern about environmental problems, CE, has an equal influence of 0.79 between students' participation (P) and their warnings (W).

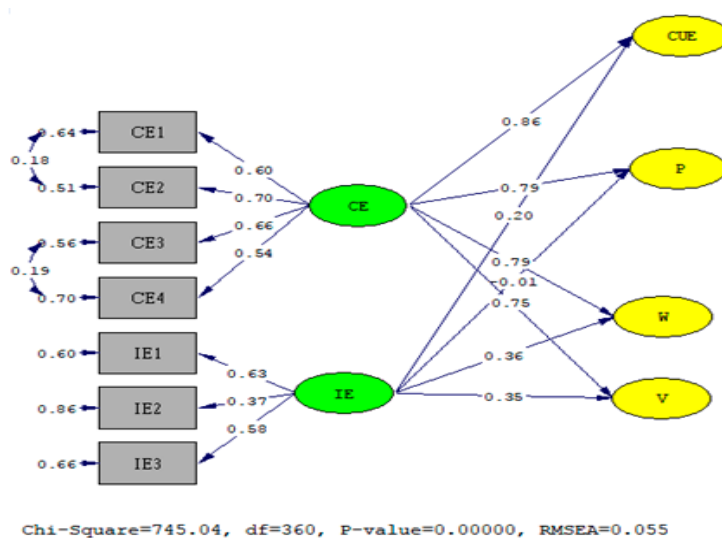


Figure 2. Correlation between importance of environment (IE) and concern about environment (CE) with student's perception latent variables.

Figure 3, presents the correlation between students' culture (CUE), participation (P), warnings (W), and volunteers actions (V) with reuse factor (R).

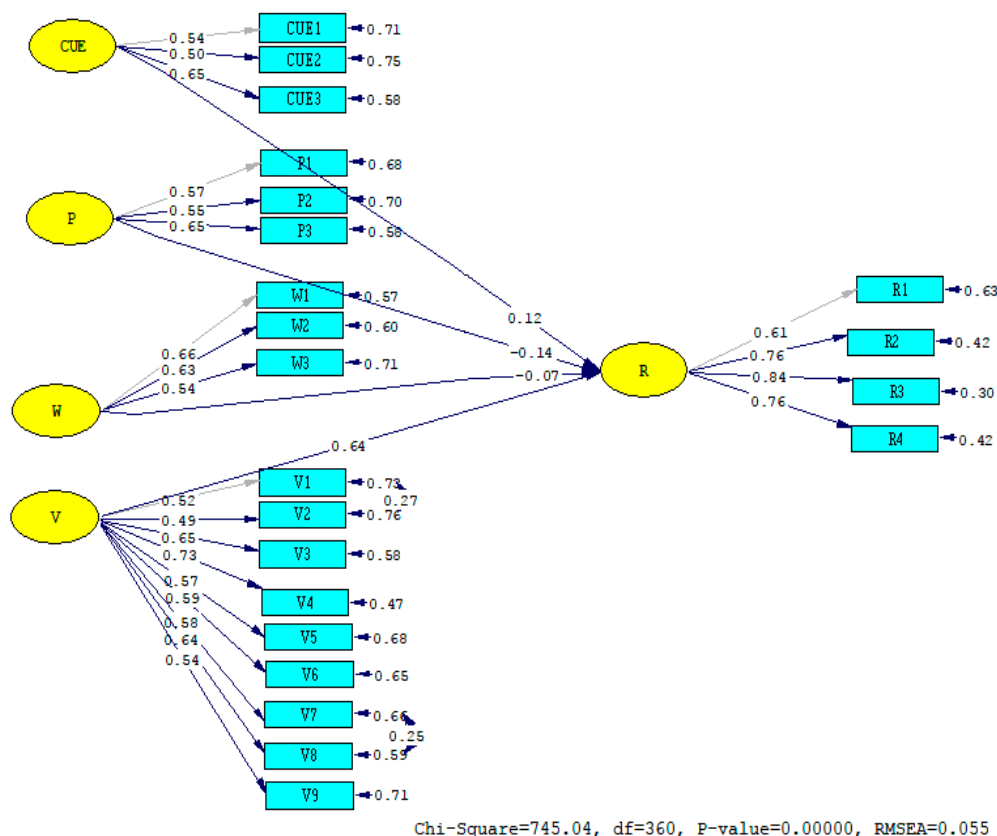


Figure 3. Correlation between students’ environmental behavior and reuse.

The results for Romanian students show that they have a strong culture because they have a strong environmental education. Correlation between culture environment (CUE) and student’s participation in reuse (R) activities obtains a value of 0.12.

Even among the students who have environmental knowledge and culture regarding the environment, their attitude towards recycling is due primarily to the lack of collection centers around the household, even if they know they are saying it would prevent them from collecting selectively, according to the study. Another reason the respondents gave is that they did not trust the responsible authorities, being convinced that garbage collected also reached the landfill or they do not know where there are containers for separate collection. The low value obtained by the R2 recycling bags and R4 renewable materials may be because the new harmonization of the market with the international standards needs time and it is very hard to change students’ mentality.

A low value of -0.16 is obtained for the correlation between students’ participation (P) and reuse factor (R), the result of this study shows us that students don’t like to participate in reuse actions; even when they know there are intelligent containers in the city, they are waiting for the issue vouchers or they think it is not their duty to reuse.

Another lowest value of -0.07 was obtained for the warning factor (W) and reuse (R), the respondents don’t know and they are not interested in the harm and health problems and they are not aware of the harmful action of waste. The bigger value of 0.64 is between the volunteer (V) and reuse factor (R), values indicating connection between the dynamic generation involved in cleaning activities, protecting nature, changing lifestyle, being green.

The bigger value for V volunteer factor between the item V1–V9 was obtained by “I will use products produced from non-renewable resources like underground oil, coal, natural gas, and mines in an economical manner because we will be unable to replace them with new resources” which show us a generation open to a new vision and becoming new citizens.

The values are appropriate; therefore, the behavior is at a high level. V (Volunteer) and R (Reuse) = 0.64; this is the highest value which shows the implication of students on recycling activities, and for the reuse variable, the biggest value was obtained by item R1 = 0.64, indicating that students are informed and they are buying ecological products even if the price is higher.

The article provides new information, and the results within the international state of research are:

- Romanian students have a high score for environmental behavior (EB), especially for volunteer activities (V);
- they have culture regarding the environment CUE but they don't like to be involved in direct activities like R reuse in a special place and special selection; they consider that there are paid personally for that;
- they are deeply involved in volunteer activities so they don't like to be pushed or forced to do their citizen's duty.

4. Conclusions

Higher education has the potential to deal with different actors from external and internal environmental issues. Universities can use their infrastructure and expertise in a positive way to achieve sustainable support in collaboration with educational institutes and centers of research. They can help to support and sustain an environmental education and educate people about the environment, to develop a green society. In conclusion, they are playing a crucial role in sustainable development. Because environment and education coexist with sustainable development, they can influence the way institutions define and put into practice environmental education.

Environmental education must be adapted and harmonize with the new environmental, political, economic, and cultural realities

Taking into consideration the students' attitude and their behavior regarding the environment, the possible factors are: The importance of environment, concerns about environment, culture environment, participation, and volunteer action, warning, and recycling influence can also make some changes following and guiding principles for environmental education.

The support for sustainable development is presented in Figure 3, where, in the author's vision, education can be for the environment (lectures, good practice), education in the environment (trips, planting tree, cleaning water), and education about the environment (sea disaster, storm, climate changes), and education to the environment.

Universities, in our case, must be sure that all the dimensions in, for, about, and to the environment are given a proper balance of information and also give them opportunities regarding national and global environmental problems and have the capacity to understand and prevent the actions which can harm the environment. The research results for environmental education and some suggestions proposed by authors are presented in Figure 4:

1. **Environmental education in Environment.** Teaching institutions should adapt their curricula, cultivating a new type of education to induce students' passion for environmental education using abilities and labs, and develop their service and practical exercises in nature, for example, learn about plants and the seasons' influence on environment attitude and behavior activities of society, cleaning actions in parks, river, recycling the garbage from touristic roads, plant as practical lessons and the influence of different external factors of influence. Creativity can be used to create from garbage some state-of-the-art fashion, art painting, or design architecture.
2. **Environmental education for the Environment.** Encouraging the students' universities, which are considered as pillars and support in environmental education, to encourage the new citizen in different actions. Encourage students to create and keep their own shape of the internal environment (university campus) because the majority of their time is spent at school and it is their learning space. Therefore, they can use non-polluted energy, for example, solar and wind energy, they can use green letter.

3. **Environmental education about Environment.** Deeper discussions to re-clarify, to criticize, and to compare some facts or attitudes towards nature and the environment; training about some specific situations and the solution taken to protect and preserve the environment for the future; a case study presentation and mass media presentation of disaster and solutions taken to prevent the situation, create an online group and volunteer activities between universities and a cross-cultural evaluation of environmental problems.
4. **Environmental education to Environment.** Students can be encouraged to sustain their opinions, to respond to environmental problems in daily life, to express freely their opinions and personal ideas, to be involved in critical situations and to find solutions in limited situations. Here, we can use the online platforms to create the virtual environment and identify solutions or model some spaces or habitats for the risk situation and develop the ethics and effects upon the environment.

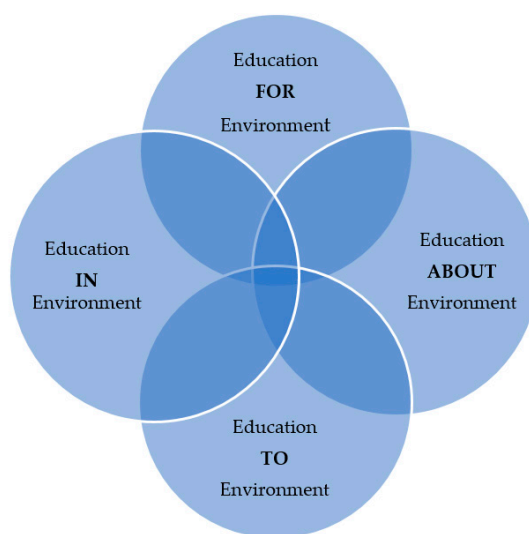


Figure 4. Education for sustainable development.

5. Future Research

This study was carried out in a single university and cannot be generalized, but the findings obtained are expected to contribute to future research. The study has certain limitations because of the region and university. The results obtained open opportunities for future research in a region or abroad, to other universities, and make a comparison of student's perception, attitude, and environmental behavior. Additional studies on environmental education could help to redefine and redesign the cultural factors with an impact on environmental decisions, or transfer of good practice and results in environmental education, establishing research and examining common topics and cultural norms with positive impacts on nature. The fields of environmental and cross-cultural research can result in effective strategies for sustainability with solutions to the environmental problems facing our society.

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