



# Increasing The Awareness of Students at Montenegrin Universities About the Importance of Sustainable Development

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## Article Info

**Received:**

23 Mei 2023

**Accepted:**

13 November 2023

**Published:**

15 November 2023

**DOI:**

10.14710/jsp.2023.20861

*Presented in the 9<sup>th</sup>  
International Workshop  
on UI GreenMetric World  
University Rankings  
(IWGM 2023)*

**Abstract.** Today's ecological problems that threaten life on the planet, including global warming, loss of biodiversity, plastic pollution of seas and oceans, are largely unrecognized by individuals and communities. In this sense, scientific institutions should play a key role in developing awareness in the community, especially among students, about the consequences of pollution, the costs of pollution, in such a way as to adopt and promote "green" development policies. Today's "green" universities recognize the importance of this important global topic and develop questions about sustainable development through their studies and extracurricular activities, promote sustainability topics through marketing activities, adopting the very concept of sustainable development in continuity. Courses focused on "green" issues are introduced through the academic curricula. This paper aims to examine the level of awareness of university students in Montenegro about the implementation and level of adoption of "green" policy in university practices and offer ways to improve this concept. The work will represent a good basis for the improvement and adoption of the concept of "green" development at Montenegrin universities.

**Keyword:**

Green Policy, Universities, Education

## 1. Introduction

Since 1991, Montenegro, as an ecological country, has drawn up the National Strategy for Sustainable Development until 2030, which imposes the need to systematically and continuously monitor the realization of the goals set within the strategy. Scientific institutions in the field of higher education, as pillars and carriers of development, continuously work on the realization of this strategy, while the community is not sufficiently aware of this important global topic.

## 2. Points of Results and Discussions

Sustainability is an issue that is monitored today at the global, national and local level and requires the full attention and commitment of the community, especially the scientific community. Universities in Montenegro should play a key role in this process, in order to assess the situation at the highest scientific level and make decisions on the introduction of a sustainable concept in the work of universities. Green universities in Europe and in the world create strategies and policies for sustainable development, basing their green concept of development on the adaptation of everything that damages the planet Earth to the smallest extent or not at all. [5] One of the greenest colleges in Europe is the Ecole hôtelière de Lausanne, as the most equipped, which has geothermal probes to collect heat for the building, photovoltaic solar panels and a new waste water heat recovery system. [4] Also, the University College of Algebra in Croatia has a very good green work concept, which is involved in several sustainability projects, including the areas of forest bioeconomy and sustainable tourism, with an emphasis on green and environmentally friendly growth. [4], In the following, we examined the attitudes and opinions of students on a sample of 100 people about the application of the green concept at universities in Montenegro.

There are four universities in Montenegro, of which the sample includes students from three universities (University of Montenegro, University of the Mediterranean, University of Donja Gorica), selected according to the criteria of year of establishment and size. Unfortunately, none of the universities in Montenegro has a student campus. There are currently 1,500 active students at the Mediterranean University, while we do not have data for other universities. The University of Montenegro has the largest number of students in Montenegro and this year it announced a competition for 4,930 new students. Respondents who entered the sample were selected according to the following criteria: full-time undergraduate or master's students; attends classes regularly, where care was taken to balance the genders represented in the sample, as well as equal representation of students from all three regions of Montenegro: northern, central, southern.

100 students from 3 regions of Montenegro participated in the research; southern, central and northern. The survey contained 16 questions, which were designed to determine the awareness and opinion among students about environmental protection, as well as their familiarity with the actions being implemented and the role of Montenegrin universities among them. Most of the questions consisted of a scale ranging from 1 to 5 or 1 to 2, depending on the concept of the question. The table 1 shows the minimum, maximum, average response (arithmetic mean) and standard deviation.

Table 1. The Minimum, Maximum, Average Response (Arithmetic Mean) and Standard Deviation

	N	Minimum	Maximum	Mean	Std. Deviation
1. Which region of Montenegro do you come from?	100	1	3	1.85	.82
2. Do you think that the status of an ecological state is sufficiently promoted in Montenegro and activities are carried out to maintain that status?	100	1	5	1.93	.99
3. At what level are you familiar with the concept of "Green University"?	100	1	5	2.41	1.14
4. How important do you think it is to spread the awareness about environmental protection and the bad influence of human behavior and habits on the environment?	100	1	5	4.19	1.00
5. Do you think that interdisciplinary teaching should be introduced in study programs in order to spread awareness about environmental impact?	100	1	5	3.72	1.13
6. Are you aware that there is an Environmental Protection Agency of Montenegro - EPA Montenegro?	100	1	2	1.50	.50
7. Are you aware that EPA Montenegro organizes scientific conferences on topics such as the protection of nature and the environment?	100	1	2	1.51	.50
8. Are you aware that EPA Montenegro, in cooperation with the competent Ministry, donors and other companies, organizes ecological actions of	100	1	2	1.51	.50

	N	Minimum	Maximum	Mean	Std. Deviation
greening cities, settlements, public institutions, etc.?					
9. Would you participate in the same/similar environmental actions?	100	1	2	1.25	.44
10. Which of the above do you think should be implemented at universities in Montenegro?	100	1	5	2.28	1.09
11. Are you aware that courses in the field of eco-marketing are studied at the Faculty of Economics and Business, University of the Mediterranean, as part of the curriculum of marketing management? (Marketing of ecologically safe products; combination of ecology and aesthetics, change of production processes, sustainable design of products and packaging, promotion strategy...)	100	1	2	1.39	.49
12. Are you aware that ecologically oriented programs are presented at the Faculty of Information Technologies, University of the Mediterranean? (presentation of the Amplitudo company and the "My Tree" mobile application project (GoPlant.me))	100	1	2	1.53	.50
13. Are you aware that at the University of Donja Gorica, there is a Faculty of Food Technology, Food Safety and Ecology, where the focus is on environmental protection, especially from the point of view of Montenegro as an ecological state?	100	1	2	1.36	.48

	N	Minimum	Maximum	Mean	Std. Deviation
14. Are you familiar with the work of the Center for Climate Change, Natural Resources and Energy (CCCNRE), University of Donja Gorica?	100	1	2	1.62	.49
15. Are you aware that at the Faculty of Metallurgy and Technology, University of Montenegro, there is a course of undergraduate and postgraduate studies in Environmental Protection?	100	1	2	1.43	.50
16. Do you think that all universities in Montenegro should focus more on the "green" business concept?	100	1	5	4.07	1.01
Valid N (listwise)	100				

Survey and answers of respondents:

**1. Which region of Montenegro do you come from?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Southern	42	42.0%	42.0%	42.0%
Central	31	31.0%	31.0%	73.0%
Northern	27	27.0%	27.0%	100.0%
Total	100	100.0%		

From the table, we can see that 42% of respondents come from the southern region of Montenegro, 31% from the central region and 27% from the north.

**2. Do you think that the status of an ecological state is sufficiently promoted in Montenegro and activities are carried out to maintain that status?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Totally disagree	40	40.0%	40.0%	40.0%
I do not agree	38	38.0%	38.0%	78.0%
Neutral	12	12.0%	12.0%	90.0%
I agree	9	9.0%	9.0%	99.0%
Totally agree	1	1.0%	1.0%	100.0%
Total	100	100.0%		

From the table, we can conclude that 78% of the respondents have a negative attitude towards the promotion and implementation of the activities of Montenegro as an ecological state. 12% of respondents are neutral, and only 10% have a positive attitude.

**3. At what level are you familiar with the concept of "Green University"?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid I'm not familiar at all	21	21.0%	21.0%	21.0%
I'm not familiar	43	43.0%	43.0%	64.0%
Neutral	15	15.0%	15.0%	79.0%
Partially familiar	16	16.0%	16.0%	95.0%
Fully aware	5	5.0%	5.0%	100.0%
Total	100	100.0%		

To the question where the opinion of the students regarding their familiarity with the concept of "Green University" was examined, we can see that 64% of respondents have a negative answer (21% are not familiar at all, 43% are not familiar). 15% of respondents had a neutral attitude, and the remaining 20% were familiar with the "Green University" concept.

**4. How valid do you consider the spread of awareness about environmental protection and the bad influence of human behavior and habits on the environment?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Totally irrelevant	1	1.0%	1.0%	1.0%
I don't consider it important	10	10.0%	10.0%	11.0%
Neutral	6	6.0%	6.0%	17.0%
Important ones	35	35.0%	35.0%	52.0%
Very important	48	48.0%	48.0%	100.0%
Total	100	100.0%		

48% of respondents consider spreading awareness about environmental conservation very important, 35% important, that is, 83% of respondents think it is important to spread awareness about environmental conservation and the bad influence of human behavior.

**5. Do you think that interdisciplinary teaching should be introduced in study programs in order to spread awareness about environmental impact?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Totally disagree	3	3.0%	3.0%	3.0%

	Frequency	Percent	Valid Percent	Cumulative Percent
I do not agree	13	13.0%	13.0%	16.0%
Neutral	24	24.0%	24.0%	40.0%
I agree	29	29.0%	29.0%	69.0%
Totally agree	31	31.0%	31.0%	100.0%
Total	100	100.0%		

From the table above, we can see that 60% of students believe that interdisciplinary teaching should be introduced with the aim of expanding awareness of environmental protection. 24 respondents gave a neutral answer, while 16 disagreed.

**6. Are you aware that there is an Environmental Protection Agency of Montenegro - EPA Montenegro?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	50	50.0%	50.0%	50.0%
No	50	50.0%	50.0%	100.0%
Total	100	100.0%		

50% of students are aware of the existence of EPA Montenegro.

**7. Are you aware that EPA Montenegro organizes scientific conferences on topics such as the protection of nature and the environment?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	49	49.0%	49.0%	49.0%
No	51	51.0%	51.0%	100.0%
Total	100	100.0%		

**8. Are you aware that EPA Montenegro, in cooperation with the competent Ministry, donors, and other companies, organizes ecological actions of greening cities, settlements, public institutions, etc.?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	49	49.0%	49.0%	49.0%
No	51	51.0%	51.0%	100.0%
Total	100	100.0%		

49% of respondents are aware of the activities of EPA Montenegro

**9. Would you participate in the same/similar environmental actions?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	75	75.0%	75.0%	75.0%
	No	25	25.0%	25.0%	100.0%
Total		100	100.0%		

From the answers to this question, we see that 75% of respondents would participate in environmental actions that are implemented in Montenegro.

**10. Which of the above do you think should be implemented at universities in Montenegro?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Renewable energy	28	28.0%	28.0%	28.0%
	Recycling (e-waste, double sided printing, recycling stations...)	37	37.0%	37.0%	65.0%
	Campus greening	14	14.0%	14.0%	79.0%
	Spreading awareness among students and employees about the importance and methods of preserving the environment	21	21.0%	21.0%	100.0%
Total		100	100.0%		

28% of respondents believe that universities in Montenegro should use renewable energy, 37% believe that recycling programs should be implemented, and 21% believe that more work should be done to spread awareness among students and employees about the importance and ways of preserving the environment.

**11. Are you aware that courses in the field of eco-marketing are studied at the Faculty of Economics and Business, University of the Mediterranean, as part of the curriculum of marketing management? (Marketing of ecologically safe products; combination of ecology and aesthetics, change of production processes, sustainable design of products and packaging, promotion strategy...)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	61	61.0%	61.0%	61.0%
	No	39	39.0%	39.0%	100.0%
Total		100	100.0%		

61% of students are familiar with studying Eco-marketing at the Faculty of Economics and Business at the University of the Mediterranean, while 39% are not.



**12. Are you aware that ecologically oriented programs are presented at the Faculty of Information Technologies, University of the Mediterranean? (presentation of the Amplitudo company and the "My Tree" mobile application project (GoPlant.me))**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	47	47.0%	47.0%	47.0%
	No	53	53.0%	53.0%	100.0%
Total		100	100.0%		

53% of students not aware that ecologically oriented programs are presented at the Faculty of Information Technologies, University of the Mediterranean.

**13. Are you aware that at the University of Donja Gorica, there is a Faculty of Food Technology, Food Safety and Ecology, where the focus is on environmental protection, especially from the point of view of Montenegro as an ecological state?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	64	64.0%	64.0%	64.0%
	No	36	36.0%	36.0%	100.0%
Total		100	100.0%		

64% of respondents are aware that there is a Faculty of Food Technology, Food Safety and Ecology at the University of Donja Gorica, while 36% are not aware.

**14. Are you familiar with the work of the Center for Climate Change, Natural Resources and Energy (CCCNRE), University of Donja Gorica?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	38	38.0%	38.0%	38.0%
	No	62	62.0%	62.0%	100.0%
Total		100	100.0%		

Out of 100 respondents, 38 were familiar with the work of CCCNRE, while 62 respondents were not.

**15. Are you aware that at the Faculty of Metallurgy and Technology, University of Montenegro, there is a course of undergraduate and postgraduate studies in Environmental Protection?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	57	57.0%	57.0%	57.0%
	No	43	43.0%	43.0%	100.0%
Total		100	100.0%		

57 respondents were familiar with the Environmental Protection study program at the University of Montenegro. Out of 100 respondents, 43 are not aware of the existence of this course.

**16. Do you think that all universities in Montenegro should focus more on the "green" business concept?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Totally disagree	2	2.0%	2.0%	2.0%
	I do not agree	7	7.0%	7.0%	9.0%
	Neutral	14	14.0%	14.0%	23.0%
	I agree	36	36.0%	36.0%	59.0%
	Totally agree	41	41.0%	41.0%	100.0%
<b>Total</b>		<b>100</b>	<b>100.0%</b>		

From the results, we can see that a third of respondents (77%) believe that universities in Montenegro should focus more on the "green" business concept. 14% of respondents have a neutral attitude, and 9% have a negative attitude.

**Which region of Montenegro do you come from? × At what level are you familiar with the concept of "Green University"?**

		At what level are you familiar with the concept of "Green University"?					Total	
		I'm not familiar at all	I'm not familiar	Neutral	Partially familiar	Fully aware		
Which region of Montenegro do you come from?	Southern	Count	10	15	7	9	1	42
		Row %	23.8%	35.7%	16.7%	21.4%	2.4%	100.0%
		Column %	47.6%	34.9%	46.7%	56.3%	20.0%	42.0%
		Total %	10.0%	15.0%	7.0%	9.0%	1.0%	42.0%
	Central	Count	6	18	3	3	1	31
Row %		19.4%	58.1%	9.7%	9.7%	3.2%	100.0%	
	Column %	28.6%	41.9%	20.0%	18.8%	20.0%	31.0%	
	Total %	6.0%	18.0%	3.0%	3.0%	1.0%	31.0%	
Northern	Count	5	10	5	4	3	27	
	Row %	18.5%	37.0%	18.5%	14.8%	11.1%	100.0%	
	Column %	23.8%	23.3%	33.3%	25.0%	60.0%	27.0%	
	Total %	5.0%	10.0%	5.0%	4.0%	3.0%	27.0%	
<b>Total</b>	Count	<b>21</b>	<b>43</b>	<b>15</b>	<b>16</b>	<b>5</b>	<b>100</b>	

		At what level are you familiar with the concept of "Green University"?					Total
		I'm not familiar at all	I'm not familiar	Neutral	Partially familiar	Fully aware	
Row %		21.0%	43.0%	15.0%	16.0%	5.0%	100.0%
Column %		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total %		21.0%	43.0%	15.0%	16.0%	5.0%	100.0%

#### Chi-Square Tests

	Value	df	Asymptotic Sig. (2-tailed)
Pearson Chi-Square	7.90	8	.443
Likelihood Ratio	7.54	8	.479
Linear-by-Linear Association	.31	1	.580

By crossing the results from the questions "Which region of Montenegro do you come from" and "At what level are you familiar with the concept of "green university" " we obtained the following data:

- from the southern region, 23.8% of respondents are not familiar at all, 34.9% are not familiar, 16.7% are neutral, 21.4% are partially familiar and 2.4% are fully familiar.
- from the central region, 19.4% of respondents are not familiar at all, 58.1% are not familiar, 9.7% are neutral, 9.7% are partially familiar and 3.2% are fully familiar.
- from the northern region, 18.5% of respondents are not familiar at all, 37% are not familiar, 18.5% are neutral, 14.8% are partially familiar and 11.1% are fully familiar.

Chi-square tests show that there is no significant difference between regions in terms of familiarity with the concept of "Green University".

#### **At what level are you familiar with the concept of "Green University"? × Do you think that all universities in Montenegro should focus more on the "green" business concept?**

		Do you think that all universities in Montenegro should focus more on the "green" business concept?					Total	
		I'm not familiar at all	I'm not familiar	Neutral	Partially familiar	Fully aware		
At what level are you familiar with the concept of "Green University"?	Southern	Count	1	2	6	13	20	42
		Row %	2.4%	4.8%	14.3%	31.0%	47.6%	100.0%

		Do you think that all universities in Montenegro should focus more on the "green" business concept?					Total
		I'm not familiar at all	I'm not familiar	Neutral	Partially familiar	Fully aware	
Total	Column %	50.0%	28.6%	42.9%	36.1%	48.8%	42.0%
	Total %	1.0%	2.0%	6.0%	13.0%	20.0%	42.0%
	Central Count	0	4	4	14	9	31
	Row %	.0%	12.9%	12.9%	45.2%	29.0%	100.0%
	Column %	.0%	57.1%	28.6%	38.9%	22.0%	31.0%
	Total %	.0%	4.0%	4.0%	14.0%	9.0%	31.0%
	Northern Count	1	1	4	9	12	27
	Row %	3.7%	3.7%	14.8%	33.3%	44.4%	100.0%
	Column %	50.0%	14.3%	28.6%	25.0%	29.3%	27.0%
	Total %	1.0%	1.0%	4.0%	9.0%	12.0%	27.0%
Total	Count	2	7	14	36	41	100
	Row %	2.0%	7.0%	14.0%	36.0%	41.0%	100.0%
	Column %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Total %	2.0%	7.0%	14.0%	36.0%	41.0%	100.0%

#### Chi-Square Tests

	Value	df	Asymptotic Sig. (2-tailed)
Pearson Chi-Square	6.03	8	.644
Likelihood Ratio	6.45	8	.597
Linear-by-Linear Association	.13	1	.720
N of Valid Cases	100		

By crossing the results from the questions "Which region of Montenegro do you come from" and "Do you think that all universities in Montenegro should focus more on the "green" business concept?" we received the following information:

- From the southern region, 2.4% of respondents (1 respondent) do not agree at all, 4.8% disagree, 14.3% of respondents have a neutral attitude, 31% of respondents agree and 47.6% completely agree.
- From the central region, 12.9% of respondents disagree, 12.9% are neutral, 45.2% agree and 29% completely agree.
- From the northern region, 3.7% of respondents do not agree at all, 3.7% disagree, 14.8% of respondents are neutral, and 33.3% have a positive attitude - agree and 44.4% - completely I agree.

The results of the Chi-square test indicate that there is no significant difference in the opinion about the "green" business concept between the 3 regions in Montenegro, but that the opinion is similar in all three regions, i.e. that universities in Montenegro should focus more on the "green" business concept.

### 3. Conclusion or Concluding remarks

The implementation of NSOR by 2030 in Montenegro requires improvement of the existing institutional organization and financing system for sustainable development, and the systematic organization of monitoring progress in the implementation of NSDR by applying indicators of sustainable development. [2] Education sector can transform themselves into Green Education in terms of their opportunities and challenges by considering advents in technology and readiness of the learners. [3] In order to keep the institution on-task and to coordinate between key actors, there will need to be an allocation of financial and human resources. [1]

From the conducted research, it can be concluded that the awareness of sustainable development among Montenegrin students is very low. We saw that all three universities in some way spread awareness about the importance of sustainable development, as well as that there is a desire among students to somehow contribute to environmental protection and reducing the negative impact of people on the environment. Universities should work on raising both awareness and capacity, and through marketing techniques and tools, reach as much as possible to the entire public so that the entire community is as environmentally aware as possible.

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