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Original article

A comparative study of environmental awareness among students pursuing Bachelor´s studies in selected academic fields at the University of Warsaw, Poland

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ABSTRACT

The present investigation has been conducted to compare the level of environmental awareness among the University of Warsaw Bachelor students of selected fields of study, which are: economics, geography and environmental protection. Diagnostic survey method was used to collect data from 180 students. The research interviewees included 60 economics students (equivalent to 33.3% of all respondents), 56 geography students (31.1% of respondents) and 64 environmental science students (35.6% of respondents). The gender division was as follows: 119 females (66.1% of all respondents) and 61 males (33.9%) took part in the research. The survey consisted of two parts. The main part - "The study of environmental awareness" - referred to the dependent variable. Respondents were asked to provide answers to 21 questions. Twenty of them were closed-ended questions, while one was open-ended. The second part was demographics, which referred to independent variable – selected socio-demographic characteristics of respondents. The data were subjected to descriptive and chi-square analyses. Statistical analysis software STATA for Windows was used for statistical analysis. The significance level was set at 5%. The study showed that the field of study significantly affects the answers declared by students in 6 of 21 questions (number: 6, 8, 11, 12, 16 and 20). Gender significantly affects the answers declared by students in 2 questions (number: 2 and 10). It can therefore be assumed that field of study had much stronger influence on student's level of environmental awareness than their gender.

KEY WORDS: environmental education, higher education, ecology

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1. Introduction

It is beyond dispute that universities have a critical role to play in developing tomorrow's decision-makers, professionals and citizens. Equally, in today's world it would seem essential that all would-be university graduates – irrespective of their exact fields of study – should have an awareness of the importance of environmental threats, and of their influence on different fields of human activity and on quality of life. Moreover, as universities should also be places in which academics and students participate jointly in resolving local problems here and now, there is a request that a model for cooperation with different non-academic actors outside university (like NGOs, local governments, etc.) be devised. The widespread nature of these kinds of expectation where universities are concerned has been confirmed in many studies made ready to mark the UN Decade of Education for Sustainable Development. An opinion worth citing from the monograph *Higher Education for Sustainability* (ADOMSSENT ET AL., 2006) prepared by an international team of authors holds that: "University education has a significant influence on the manner in which future generations in positions of responsibility will be able to deal with the complex demands they will be faced with, as the result of globalization, world trade, poverty, the environment and development" (ADOMSSENT, 2006).

In turn, according to the Institute of Advanced Studies from The UN University: "Universities are called on, not only to teach the skills required to advance successfully in a globalized world, but also to nourish in their students a positive attitude toward environmental issues and cultural diversity; to help them understand how a richness of both nature and culture can contribute to the better life in a safer world for all; to instil in young people the desire to contribute to their society and its environment" (UNU-IAS, 2005).

Nevertheless, the activities serving the development of positive attitudes toward environmental issues among students that seem to be expected require at least a preliminary appraisal of the way in which students relate to environmental issues.

"Environmental awareness" is a broad term, which refers to a recognition of the adverse effects human behaviour (and current technological and social developments) have on the natural environment. It is largely synonymous with "environmental concern", defined as ''the affect associated with beliefs about environmental problems'' (BURGER, 2005; BOŁTROMIUK ET AL., 2008). Many studies (BEST, 2010; CARRUS ET AL., 2005) report that environmental awareness/concern is a necessary precursor to pro-environmental action. Unfortunately, all the long-term studies that have been conducted by various institutions and research centres as regards the level of environmental awareness among Poles point to its being very low in comparison with that characterising citizens of other European Union Member States. To be cited as an example here are the results of a comparative analysis based on the results of a flash *Eurobarometer* survey requested by DG Environment as regards the attitudes towards biodiversity present in different Member States (KALINOWSKA, 2014; EUROPEAN COMMISSION, 2013).

In studying environmental awareness among students, researchers need to recall the specific age group that is involved. Typical students in Poland are at ages 19-24 years. This is therefore a very interesting group whose experience of, and attitude towards, the environment is mostly based on earlier years of education, as well as the environmental attitudes present in the family.

An interesting, while disturbing, fact was generated by studies entitled "Poles in the mirror of ecological ..." (BOŁTROMIUK ET AL., 2008) and "Environmental awareness of Poles". Analysis of the results of quantitative research in the years 1992-2011" (STRUMIŃSKA-KUTRA, 2011). These show that people in the 18-24 age group, i.e. potential students, differ from people of other age groups in seeing environmental protection issues as of far lesser importance.

Offering partial confirmation of this are conclusions to be drawn from pilot questionnaire research done in 2011, on a mixed group of 258 students representing most of the Faculties at the University of Warsaw, with no *a priori* assumptions regarding respondents' fields of study (except that students of the course of Inter-Faculty Studies in Environmental Protection were precluded from participation, given the author's assumption that survey results in their cases would be testing knowledge, rather than views) (SKRZYPIEC, 2011). It is worth citing here one of the key results of that work, which related to answers regarding a 0-10 self-evaluation of students' knowledge of environmental issues. In response, a clear majority (69.5%) of respondents came out with evaluations for this that equated to below-average or average knowledge, while just 2% assigned values for their knowledge sufficient to qualify as "good" or "very good". Perhaps even more seriously, students asked to assess the extent to which items of latest news on the environment were of interest to them gave evaluations suggesting strongly that the interest is limited. And while students (like other groups in society participating (BURGER, 2005; BOŁTROMIUK ET AL., 2008) confirmed that the key sources of information on the environment are the media and the Internet, the most reliable form – and key source – of knowledge transfer in this area is seen to be the lecture or other utterance of the university specialist (SKRZYPIEC, 2012). Then add to that the fact that, in answer to a question as to whether information on environmental problems filters through to them via this higher-education-establishment route, as many as 66.5% of respondents stated straightforwardly that it did not. Taken together, these answers represent an encouragement to reflection on whether and to what extent the university is meeting expectations held out for it when it comes to evoking interest in environmental matters, and getting across the crucial nature of these for future professional life, irrespective of the particular field in which academic studies are being pursued. Although many studies conducted do point to a level of environmental awareness, comparative studies of environmental awareness among students in different selected fields of study remain very scarce. It was the aim of presented investigation to compare the level of environmental awareness among the University of Warsaw Bachelor students of selected fields of study, which are: economics, geography and environmental Protection. This can

makes results of studies presented here unique, given that they do indeed compare the awareness of students learning at various different University Faculties with that among students specializing in the environment.

2. Materials and methods

The research was designed to study environmental awareness of student's at University of Warsaw. Because of the sample selection, this research is of an exploratory type. In order to generalize results obtained from a random sample for the whole population, this sample must be representative. This means that the structure of the sample, or rather parameters under the scrutiny, needs to mirror the structure of the general population.

In the study of the environmental awareness among students of selected fields of study at the University of Warsaw, diagnostic survey method was used. Diagnostic survey is one of the most common methods used in social research. The survey was developed based on the survey used in the nationwide study of environmental awareness of Poles executed by the Centre for Public Opinion Research (the Institute for Sustainable Development) in 2008 (BOŁTROMIUK & BURGER, 2008) and 2009 (BOŁTROMIUK, 2009).

The survey consists of two parts. The first part, "The study of environmental awareness" refers to the dependent variable, while the second part is demographics, which refers to independent variable - selected socio-demographic characteristics of respondents. In the first part, the survey contains twenty one questions. Twenty of them are closed-ended questions, while one (question 8) is open-ended. Closed-ended questions have been accompanied by a conjunctive and disjunctive cafeteria (multiple choice questions with one or many answer to be selected): nine of them with closed disjunctive cafeteria (questions: 1, 2, 10, 11, 12, 16, 17, 18, 20), one question with half open disjunctive cafeteria (question: 19), ten questions with closed conjunctive cafeteria (questions: 3, 4, 5, 6, 7, 8, 9, 13, 14, 15), two semi-open questions with conjunctive cafeteria (questions 3, 21). Four of the questions are filter questions (questions: 12, 16, 19, 20). The second part of the survey consists of two socio-demographic questions.

The survey was carried out among students of the University of Warsaw in the period of April-June 2014. Students in fields of economics, geography and environment were asked to full in the survey. Surveys were collected from students of the second year of bachelor study.

Both descriptive and inferential statistics were used in analysing the data collected. The descriptive statistics involves the use percentages while the inferential statistic entails the use of chi square analysis. Chi square test was used to examine the association between selected socio-economic variables and environmental awareness of students. Statistical analysis software STATA for Windows was used for statistical analysis. The significance level was set at 5%.

3. Results and discussions

This section examines some of the socio-economic features of the respondents. As shown in Table 1, 180 students fulfilled the survey. The research interviewees included 60 economics students (equivalent to 33.3% of all respondents), 56 geography students (31.1% of respondents) and 64 environmental science students (35.6% of respondents) (Table 1). The gender division between students was as follows:

- economics students: females – 63.3%, males – 36.7%
- geography students: females – 62.5%, males – 37.5%
- environmental science students: females – 71.9%, males – 28.1%.

All together, 119 females (66.1% of all respondents) and 61 males (33.9%) took part in the research. The summary of the main results is showed in the Table 2. The table provides the information about the impact of gender and field study on the answers declared by students in the questionnaire.

Table 1. Selected socio-economic characteristics of the respondents

Field of study	Gender				All	
	Women		Men			
	N	%	N	%	N	%
Economics	38	63.3	22	36.7	60	33.3
Geography	35	62.5	21	37.5	56	31.1
Environmental protection	46	71.9	18	28.1	64	35.6
All	119	66.1	61	33.9	180	100

Table 2. Summary of the main results

Questions	Chi Square - field of study	p value	Remark	Chi Square -gender	p value	Remark
1. How would you rate the condition of the Earth's Environment ?	8.953	0.062	not significant	0.948	0.623	not significant
2. How serious do you believe the problems are with the Environment?	9.147	0.330	not significant	10.809	0.029	significant
3. What are the two biggest threats to the Environment?	7.837	0.645	not significant	2.397	0.792	not significant
4. What are two the most important national laws for protecting our natural Environment?	1.393	0.994	not significant	6.569	0.161	not significant
5. What three factors would most improve the Environment?	14.016	0.172	not significant	3.195	0.670	not significant
6. Please select which categories of these are protected areas of Poland?	12.906	0.002	significant	0.544	0.461	not significant
7. Please connect with lines: the category of waste with the proper color of its recycling bin.	2.273	0.321	not significant	0.013	0.910	not significant
8. Please list all the Environmental Organizations you know.	14.554	0.006	significant	3.454	0.178	not significant
9. What are your main sources of information regarding the environment? You can select multiple answers.	19.284	0.375	not significant	11.192	0.263	not significant
10. What is your opinion about the activities of Environmental Organizations?	2.616	0.855	not significant	15.382	0.002	significant
11. How do you rate your level of knowledge regarding environmental issues?	76.669	<0.000001	significant	6.489	0.090	not significant
12. Do you take specific steps to protect the environment in your everyday life?	14.378	0.006	significant	2.953	0.228	not significant
13. What are your two strongest motivations for protecting the Environment?	12.585	0.127	not significant	2.864	0.581	not significant
14. What are the most common reasons why some people are not willing to take any actions to protect the environment? Please select up to two answers.	11.522	0.485	not significant	5.409	0.493	not significant
15. Please select from below those of the landscape parks that are located in the region of Mazovie.	8.689	0.069	not significant	5.069	0.079	not significant
16. Do you follow the labels on waste containers during their ejection disposal?	12.561	0.014	significant	0.234	0.890	not significant
17. What is your assessment of the actions of local authorities in the field of environmental protection in the place of your in your city/town?	2.405	0.662	not significant	2.264	0.322	not significant
18. What is your assessment of the changes that have occurred in the condition of regarding the environment since Polish accession to the European Union?	5.264	0.072	not significant	0.129	0.720	not significant
19. Are you a member of any environmental organization?	1.128	0.569	not significant	0.092	0.761	not significant
20. Did you take an active part in any local action to protect the environment?	7.153	0.028	significant	3.013	0.083	not significant
21. Please specify the type of local action for the protection of the environment in which you participated in the past two years?	3.926	0.864	not significant	2.778	0.596	not significant

The study showed that the field of study significantly affects the answers declared by students in questions 6, 8, 11, 12, 16 and 20. Gender significantly affects the answers declared by students in questions 2 and 10. No other significant differences among students were found ($p > 0.05$).

3.1. Field of study differences

Respondents were asked to identify nature protection areas. According to the nature protection Act of 16 April 2004, the natural environmental protection system encompasses the following forms of protection: “national parks, nature reserves,

landscape parks, areas of protected landscapes, natural monuments, documentation sites, areas of ecological use, nature and landscape complexes, and areas of the European Ecological Network Natura 2000". Only 11% of respondents correctly selected all of them (Table 3). There was a noticeable correlation between the subject of study pursued by respondents and their response. Correct answers were provided most often by environmental science students (21.5%). Among geography and economics students the correct answers were given by 8.9% and 1.7% of students respectively.

The next question was designed to check the knowledge of the Environmental Organizations among respondents. The outcomes are presented in the Table 4. It can be seen that 67.2% of respondents were able to list at least one Environmental Organization. Students listed following entities engaged in activities to protect the environment and animal rights: 56% Greenpeace; 30% WWF (World Wide Fund for Nature); 4% Klub Gaja; 3% League of Nature Conservation; 1% OTOP (Polish Society for the Protection of Birds), Green Mazovia and Peta; <1% (one person each) REC (Regional Environmental Center), Salamander, stork, Viva, Workshop for All Beings, GAP (Global Action Plan) Poland. Every third respondent couldn't list any Environmental Organizations or pointed to entities that are not Environmental Organizations *sensu stricto* (eg. Green party or UNESCO).

The degree of knowledge on Environmental Organizations was also strongly correlated with respondents' subject of study. Environmental science students were able to give two or more correct answers more often than the rest of respondents (45% compared with 18.3% of economics students) and were unable to provide answers less often than others - 31.7%.

Students of environmental protection are the best educated in this regard from the sample. They have both: the lowest non-response rate as well as being the only group in which students listed four (2%) or five (3%) correct Environmental Organizations. Also this group had the highest percentage of students who knew three Organizations (13%) compared to students of geography (2%) or economics (0%).

Table 3. The responses of the students to the question 6 - "Please select which categories of these are protected areas of Poland?"

Student responses (correct or incorrect)	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Correct	1	1.7	5	8.9	14	21.5	5	8.2	14	11.8	19	10.6
Incorrect	59	98.3	51	91.1	51	78.5	56	91.8	105	88.2	161	89.4

Table 4. The responses of the students to the question 8 - "Please list all the Environmental Organizations you know"

Student responses (number of correct answers)	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
None	21	35.0	18	32.1	19	31.7	14	24.1	44	37.0	58	32.8
1 organization	28	46.7	26	46.4	14	23.3	27	46.6	41	34.5	68	38.4
2 or more organizations	11	18.3	12	21.4	27	45.0	17	29.3	34	28.6	51	28.8

Question number 11 was asked to find out how students rate the level of their knowledge regarding environmental issues. As displayed in the Table 5, 55% of respondents claimed that their level of knowledge regarding environmental issues is good or very good. On the other hand, over 41% admitted that they have just a little of knowledge about environmental issues. Similar question was asked in the research "Polish Measurement of Attitudes and Values (PPPiW)" conducted using the PAPI technique on a representative sample of 1080 citizens of Warsaw, aged 18 years and older. The research comprised 6 modules including one called "Ecology and lifestyle". The research showed that citizens of Warsaw estimate their level of knowledge on environmental protection quite low. Almost half of respondents (49.1%) rated their own knowledge as 'average', it was described as 'good' by almost one third of respondents (31.9%), whilst one in ten described their knowledge as 'inadequate' (WIŚNIEWSKI, 2012).

Table 5. The responses of the students to the question 11 - "How do you rate your level of knowledge regarding environmental issues?"

Student responses	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Very well	0	0.0	0	0.0	6	9.5	0	0.0	6	5.1	6	3.4
Well	8	13.3	37	66.1	48	76.2	34	55.7	59	50.0	93	52.0
I have a little knowledge on the topic	47	78.3	18	32.1	9	14.3	23	37.7	51	43.2	74	41.3
I have no knowledge on the topic	5	8.3	1	1.8	0	0.0	4	6.6	2	1.7	6	3.4

Results of the conducted research suggest that the study area affects the level of knowledge on environment protection. Economics students tend to gauge their knowledge in this area as the lowest (only 13.3% rated it as 'good' and nobody as 'very good'). The highest level of knowledge was declared by environmental science students where 76.2% rated their knowledge as 'good' and 9.5% as 'very good'. The Table 6 provides information on students following the labels on waste containers during the ejection disposal.

The issue of waste segregation also correlates with a study discipline. 76.1% respondents studying environmental science confirm that they always segregate their waste according to the instruction on the package. Among geography students, the percentage of people separating waste is 54.8% and among economics students it is 44.2%. It is economics students who most frequently claim to segregate waste only sometimes or never – 16.3%. Though most of the respondents (59%) declared that they always follow the labels on waste containers during their disposal, the results should be seen in the context of the question 7, in which only 33% of respondents correctly joined all listed categories of waste with the proper colour of its recycling bin.

The question number 12 was asked to determinate if students take specific steps to protect the environment in their everyday life. The results have been recorded in the Table 7. Majority of surveyed students (74%) indicated that they take specific steps to protect the environment in their everyday life. Only about 11% claim they do not take those steps, while 15% was never thinking about that. It needs to be stressed that the research examined attitudes and not the practical engagement; therefore, these outcomes should be regarded with a degree of scepticism. The PPPiW study discussed earlier did not confirm such optimistic results (WIŚNIEWSKI, 2012).

Table 6. The responses of the students to the question 16 - "Do you follow the labels on waste containers during their ejection disposal?"

Student responses	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes, always	19	44.2	23	54.8	35	76.1	23	56.1	53	60.2	76	58.9
Yes, usually	17	39.5	17	40.5	9	19.6	14	34.1	28	31.8	42	32.6
Just sometimes or not at all	7	16.3	2	4.8	2	4.3	4	9.8	7	8.0	11	8.5

Table 7. The responses of the students to the question 12 - "Do you take specific steps to protect the environment in your everyday life?"

Student responses	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	32	58.2	42	75.0	59	85.5	41	66.1	92	78.0	133	73.9
No	12	21.8	4	7.1	4	5.8	9	14.5	11	9.3	20	11.1
I was never thinking about that	11	20.0	10	17.9	6	8.7	12	19.4	15	12.7	27	15.0

According to the Table 7, it is clear that the field of study strongly determinate the willingness to take specific steps to protect the environment. A greater number of environmental science students claim to be undertaking practical steps for environmental protection on a daily basis. 85.5% confirm that they actively engage in environmental protection; equivalent figures for geography students was 75% and for economic students was 58.2%. The question number 20 was asked to find out if students take an active part in any local action to protect the environment.

As shown in the Table 8, 60% of the students do not take active part in any local actions to protect the environment. Every second student of geography claims to take such an actions. Among environmental protection students, the percentage of people taking an active part in local actions to protect the environment is 43.8% and among economics students it is just 26.7%.

Table 8. The responses of the students to the question 20 - "Did you take an active part in any local action to protect the environment?"

Student responses	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	16	26.7	28	50.0	28	43.8	19	31.1	53	44.5	72	40.0
No	44	73.3	28	50.0	36	56.3	42	68.9	66	55.5	108	60.0

3.2. Gender differences

The condition of the environment is a serious problem in the opinion of more than three quarters of all respondents. When ask the question: “How serious do you believe the problems are with the Environment?” 77% of respondents chose the answer: "quite important" or "very crucial”. Just in the opinion of 19% of students the environment constitutes a "minor" problem or "not a problem at all (Table 9).

When it comes to the question relating to the personal assessment of environmental problems, there was a clear correlation between answers and the respondent’s gender. Namely, women more likely regarded environmental problems as quite important (68.4%) or very crucial (13.7%), whilst men considered environmental problems as quite important (57.4%) or minor (23%).

The question number 10 was asked to determinate students' opinion about the activities of Environmental Organization (Table 10). More than half of students believe that the activities of environmental organizations are mostly focused on making noise in the media. Only every fourth student believes that environmental organizations really care about the environment. The remaining participants believe that Environmental organizations mainly inhibit or in the best case do not affect the economic development of the country.

Perception of environmental organizations is not determined by the chosen study discipline, however; it is connected with the respondents’ gender. Females more often than men notice positive aspects of environmental organizations’ functioning (the answer stating that such organizations help protecting the natural environment was chosen by 30.4% women and only 16.7% men) and criticise them less often (only 2.6% women think that environmental organizations hinder the national economic growth compared with a much bigger group of men – 18.3%).

Table 9. The responses of the students to the question 2 - "How serious do you believe the problems are with the Environment?"

Student responses	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Very crucial	5	8.3	5	8.9	11	17.7	5	8.2	16	13.7	21	11.8
Quite important	36	60.0	39	69.6	40	64.5	35	57.4	80	68.4	115	64.6
Minor	13	21.7	8	14.3	8	12.9	14	23.0	15	12.8	29	16.3
Not a problem at all	4	6.7	2	3.6	0	0.0	5	8.2	1	0.9	6	3.4
Have no opinion	2	3.3	2	3.6	3	4.8	2	3.3	5	4.3	7	3.9

Table 10. The responses of the students to the question 10. "What is your opinion about the activities of Environmental Organizations?"

Student responses	Economics		Geography		Environmental protection		Men		Women		All	
	N	%	N	%	N	%	N	%	N	%	N	%
They care about environmental issues	13	22.0	12	22.6	20	31.7	10	16.7	35	30.4	45	25.7
They hinder economic development of the country	5	8.5	4	7.5	5	7.9	11	18.3	3	2.6	14	8.0
They do not have a major impact on the economic development of the country	7	11.9	9	17.0	8	12.7	7	11.7	17	14.8	24	13.7
They focus mainly on making noise in the media rather than on specific actions	34	57.6	28	52.8	30	47.6	32	53.3	60	52.2	92	52.6

4. Conclusions and recommendations

The study showed that the field of study significantly affects the answers declared by students in six questions (6, 8, 11, 12, 16 and 20). Gender significantly affects the answers declared by students just in two questions (2 and 10). The significance level was set at 5%. It can therefore be assumed that gender determines the level of environmental awareness in much lower level than the field of study. The other conclusions drawn from this research are that the general level of environmental awareness of the surveyed students is low, which confirms the outcomes of previously conducted investigations eg. Polish Measurement of Attitudes and Values (PPPiW), and that the level of environmental awareness of students of natural sciences (geography and environment) is higher than students of economics.

The questions asked in the questionnaire concentrated mostly on knowledge and awareness, but can open space for further investigations to cover also competences and ability to act for environment. For example such complex research into students attitudes towards and skill for sustainable development was conducted in British universities (DRAYSON ET AL., 2012). Students answers may serve as a key indicator of quality of environmental education in an university and help higher education institutions determine the directions in which they should be acting, if the goals of students being encouraged to develop an interest in the environment – and acquire relevant knowledge thereupon – are to be achieved. This will of course require the development of the competences of staff in the field of education for sustainable development, and this is a challenge facing a majority of institutions in higher education across the EU participating in the UE4SD Project. This has Project members across Europe working to support the development of competences among university educators (UE4SD, 2014). Comparison of the levels of environment awareness among students in selected fields of study may also serve as a key indicator when it comes to the educational offer – especially all-university classes, as well as a source of inspiration for activity programmes among the self-organized by University's students Scientific Clubs (Koła naukowe).

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