

## How Do Undergraduate Geography Students Perceive Environment and Sustainable Development? A Case Study from Turkey

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**Abstract:** In the last few decades, environment and sustainable development (SD) education has gained great importance in the geography curricula of many countries. It is taught at all levels of education to make students more conscious about the environmental degradation caused by the exploitation of natural resources. However, there is an urgent need to investigate students' opinions of and attitudes towards environment and SD to find out whether Turkish schools provide adequate education for environment and SD in Turkey. This study aims to reveal to what extent students know about environment and SD and how they perceive these concepts by evaluating the outcomes of a questionnaire distributed to geography undergraduate students. The research results indicate that students' knowledge regarding environmental issues is reasonable, but that there are significant knowledge gaps concerning SD. The most satisfying result, however, is that the majority of students think SD is important, both for meeting their own developmental and environmental needs and for those of future generations.

**Key words:** Environment • Sustainable development • Student perceptions • Undergraduate geography education

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### INTRODUCTION

Humans began to exploit natural resources more intensely after the Industrial Revolution. This development resulted, either immediately or eventually, in environmental problems and affected the availability of nonrenewable resources. Consequently, a new way of thinking, 'sustainable development', appeared as an emerging consensus following the decline in the availability of natural and nonrenewable environmental resources. The primary aim of sustainable development was to challenge and change the attitude of the world population: humankind needed to consider itself as a part of nature, not as its master [1]. In the past few decades, SD has become a key philosophy among the many precautions and activities that have the potential of restoring the physical environment.

SD was first introduced in the Brundtland Report (in *Our Common Future*) in 1987. The Brundtland Report was prepared by an international initiative comprised of members from communities that were associated with environment and development at different levels. The Brundtland Report [2] defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet

their own needs". Other than the Brundtland Report, various institutions and initiatives have dealt with environmental issues and sustainable development, including Earth Summit - Agenda 21 (1992), Lucerne Declaration, ICLEI (International Council for Local Environmental Initiatives), IDRC (International Development Research Center), UNEP (United Nations Environmental Program), OECD (Organization for Economic Co-operation and Development) and many others. These organizations aim at providing economic, environmental and social development that causes minimal or no harm to the natural environment. Their goal is to uphold the three pillars of SD: to provide for the economic, social and environmental needs of present and future generations.

Since the World Summit on Sustainable Development in 2002 proposed the adoption of a decade of "education for sustainable development", much work has been done to make SD an integral part of education curricula at all levels of national education and in the public agenda. In spite of becoming one of the most important goals of contemporary teaching programs, however, SD education still does not achieve the expected results and much more remains to be done; progress has been slow, showing that there are discrepancies between theory and practice [3, 4].

Many studies exist in the national and international arena describing the perceptions, opinions and knowledge of students regarding environment and SD at different levels of education. These studies have found that the opinions, perceptions or knowledge of both students and educators tends to focus on the debate about the concept itself [5- 8], the importance, in student learning, of taking responsibility [9-11], the relationship between environmental and sustainability education [12], the integration of SD into school curricula [13-15], the three pillars of SD [12], the knowledge gaps of students on environmental and SD issues [3, 16] and the issue of gaining administrative support for SD at all educational levels [5].

Beside these studies, the number of studies discussing SD in geography curricula [13, 17] and geography education [18-22] has increased in the last decade. This shows the increasing integration of SD into geography education around the world. The studies conducted on a national level have generally agreed that there is limited literature available about SD and students and teachers are not sufficiently familiar with this concept; they think 'development' is more important than 'sustainable development' [23-25].

Sahin *et al.* [24] have mentioned important developments in Turkey's new geography curriculum, implemented in 2004. They show that one of the curriculum's six fundamental learning modules, "Environment and Society", is directly related to environmental and sustainability education. There is, therefore, an urgent need to determine to what extent Turkish students know about environment and SD. We will be able to find the relationship between theory and the practice by scrutinizing the program and its applications through students' self-ratings and self-reported perceptions of environment and SD.

**Method:** In the study, the sections about environmental issues and SD issues were adapted from Azapagic (2005). The descriptive statistics were used to calculate frequencies and percentages. However, nonparametric tests were used, including the Mann-Whitney *U* test, to analyze the inferential statistics. This test was used to determine the relationship between demographic features (gender) and dependent variables (self-assessment parts and statements) because the data, according to a One-Sample Kolmogorov-Smirnov test, did not have a normally distributed interval variable ( $p < 0.05$ ). The reliability coefficient was 80.07%, based on a factor reliability analysis of the dependent variables (Cronbach's alpha coefficient: 0.807).

**Purpose:** This study aims at

- Finding whether the undergraduate geography students at Fatih University are familiar with the terms 'environment', 'sustainable development' and related issues,
- Investigating whether these students got enough SD education in their primary and secondary schools and
- Evaluating these students' perceptions regarding the importance and benefits of SD.

**Data Collection and Analysis:** Based on the aims of the study, we prepared and distributed a 40-item questionnaire to those geography students ( $n=82$ ) who voluntarily agreed to complete it. The questionnaire was designed in six parts:

- Personal questions, including questions concerning the gender and grade of the student.
- Environmental issues, in which students were asked to rate their knowledge about 14 environmental issues (acid rain, air pollution, biological diversity and others). We used this data to evaluate the level of knowledge students had about these issues. For each item, students had a choice of 1= "Not heard of", 2= "Heard of but could not explain", 3= "Have some knowledge" and 4= "Know a lot."
- SD issues, in which students were given 8 phenomena concerning SD and asked to self-rate their background knowledge of these terms, including the definition of SD, the carrying capacity of the earth, etc. As in the previous section, students had one of four choices: 1= "Not heard of", 2= "Heard of but could not explain", 3= "Have some knowledge" and 4= "Know a lot."
- A matching portion, which required students to match three items, including an international convention, the development of a protocol and the issuing of a report, with relevant events related to SD, climate change and environmental protection and management. This data was used to evaluate to what extent students are familiar with these events.
- Multiple choice and yes-no questions, which aimed at measuring students' knowledge regarding SD and investigating their previous education in SD.
- A statements section, which was organized to determine the agreement level of the attendees to statements about the importance of SD. The five point Likert scale was used: 1= "Strongly disagree", 2= "Disagree", 3= "Neutral", 4= "Agree", 5= "Strongly agree".

## Findings

**Demographic Features:** The demographic data indicates that, out of 82 students, the majority of participants were female (72%), while 28% of them were male. The number of students in their freshman year was 25, while 23 others were in their sophomore year, another 16 in their junior year and the remaining 18 in their senior year.

### Geography Students' Knowledge about the Environmental

**Issues:** The data collected from the second part of the questionnaire indicates that average knowledge of the students' background on environmental issues corresponds with the statement, "I have some knowledge", the average score being 3.16 out of 4. There were no environmental issues in this part that students indicated they had "heard of but could not explain" or had "not heard of".

To determine whether boys and girls differed significantly in their self-rating of their knowledge about environmental issues, Mann-Whitney *U* tests were performed; this was an appropriate procedure because the dependent variables were ordinal and variances were unequal. *P* values refer to the significant differences in the mean ranks of males and females on both the first and the eleventh issue (acid rain and salinity) ( $p < 0.05$ ). The 23 male students had significantly higher mean ranks (49.17) than the 59 female students (38.51) on the first issue. In the eleventh issue, male students also had significantly higher mean ranks (50.57) than the female students (37.97). However, male and female students did not differ significantly in the remaining issues ( $p > 0.05$ ). According to Cohen [26],  $r$  ( $r = z/\sqrt{n}$ ) values indicate that the effect size is small to medium for Issues one and eleven (Table 1).

### Geography Students' Knowledge about Sd and Related

**Issues:** Survey results suggest that the level of students' knowledge about SD and related issues is lower than their level of knowledge about environmental issues. With an average score of 2.5 out of 4, the students' average level of knowledge fell between the statements "Heard but could not explain" and "I have some knowledge". The students' answers also indicated that they "Know a lot" about population growth, with an average score of 3.6. However, their level of knowledge is lowest regarding stakeholders' participation, with the average score (1.2 out of 4) corresponding to the statement "Not heard of" (Figure 2).

In order to investigate whether the genders differed significantly in their knowledge about SD issues, further Mann-Whitney *U* tests were performed. The results of these tests support the conclusion that male and female students do not differ in their self-ratings on issues regarding SD ( $p > 0.05$ ).

**Matching:** According to the matching activity results, just 7% ( $n = 6$ ) of the 82 students could successfully complete all of the matches. 5% ( $n = 4$ ) of the participants correctly matched only the Florence Convention, 24% ( $n = 20$ ) of them succeeded in matching only the Kyoto Protocol and 9% ( $n = 7$ ) of the students found the right match only regarding the Brundtland Report. If we consider the cumulative answers, 10 students succeeded in the first match, 26 students succeeded in second match and 13 students succeeded in the third match. 36 (44%) of the 82 participants chose not to undertake this activity.

Table 1: Comparison of boys and girls in their self-rating of knowledge about environmental issues

Environmental issues*	Gender	N	Mean Rank	Sum of Ranks	U	z	p	r
1	Male	23	49.17	1131.00	502.000	-2.109	.035	-.23
	Female	59	38.51	2272.00				
11	Male	23	50.57	1163.00	470.000	-2.325	.020	-.25
	Female	59	37.97	2240.00				

\*See Figure 1 for environmental issues

Table 2: Matching table, including international events and their related SD subjects

International events	Right match	Related subject
Florence Convention	c)	Environmental protection and management
Kyoto Protocol	a)	Climate change
Brundtland Report	b)	Sustainable development

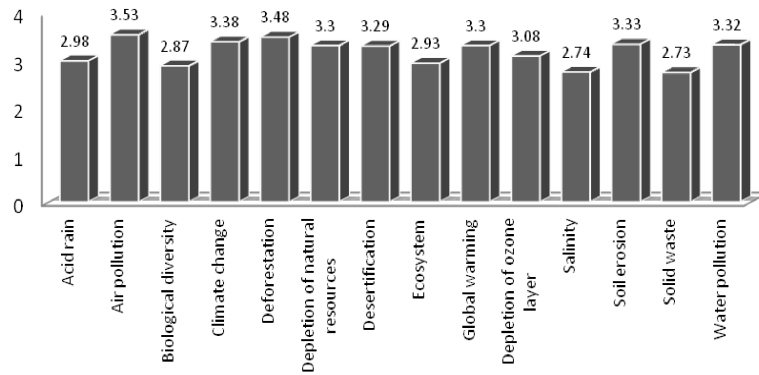


Fig. 1: Students' level of knowledge about environmental issues. The average score, 3.16, corresponds with the statement "I have some knowledge").

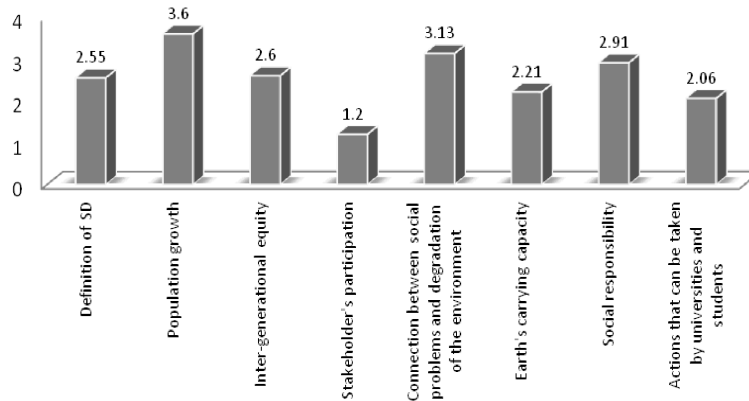


Fig. 2: Students' knowledge level of SD and related issues (average score is 2.5 for all students and corresponds to an area in between the statements "Heard but could not explain" and "I have some knowledge").

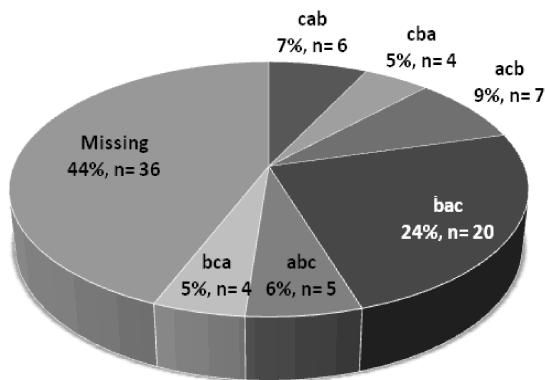


Fig. 3: Distribution of answers in matching activity

**Multiple Choice and Yes-no Questions:** In student responses to the questions about SD, its facets and the previous SD education of the student, 85.4% (n= 70) of the students could correctly identify the answer to the question, "Which of the following gives the definition of SD?". Incorrect answers were given by 10.9% of the students and the remaining 3.7% (n= 3) did not answer this question.

Students were not as successful in identifying the three fundamental components of SD; these were only identified correctly by 58.55% of the students. The yes-no questions that followed were prepared to determine the students' educational backgrounds in SD. It is quite discouraging that almost all of the students-96.3% (n= 79)-said that they had not attended any activities related to SD, including panels, courses, conferences, seminars, projects, etc. When asked whether they had received any SD education in their primary or secondary schools, just 2 of the students stated that they had received sustainability education in their high school. The remaining 80 (97.6%) students indicated that they had not received any SD education, either in their primary or secondary school education. The last question asked whether students had had any sustainability education courses in the university; almost 55% of the students said yes. This result was expected; both elective and required undergraduate courses that had included SD education were offered to those in their second and third years of education in the geography department.

Table 3: Student opinions about SD and its importance

Statements		Level of agreement		
		Strongly agree/agree	Neutral	Strongly disagree/disagree
1	SD is an important subject	<i>f</i> 73 (91.3%)	6 (7.5%)	1 (1.3%)
2	SD is given enough emphasis in Turkey	<i>f</i> 7 (8.8%)	27 (33.8%)	46 (57.4%)
3	SD should be given more place at all levels of education in Turkey	<i>f</i> 72 (88.8%)	7 (8.6%)	2 (2.6%)
4	SD is especially important for the future of society	<i>f</i> 74 (91.3%)	5 (6.2%)	2 (2.6%)
5	SD concerns decision makers and does not interest common people	<i>f</i> 1 (1.3%)	7 (8.8%)	72 (90.1)
6	There is no need for SD to create better world	<i>f</i> 2 (2.6%)	4 (5%)	74 (92.4%)
7	There is nothing I can do to promote SD	<i>f</i> 72 (90%)	4 (5%)	4 (5%)

Table 4: Comparison of boys and girls in their opinions about SD and its importance

Statements*	Gender	N	Mean Rank	Sum of Ranks	U	z	p	r
1	Male	22	54.84	1206.50	322.500	-3.917	.000	-.44
	Female	58	35.06	2033.50				
3	Male	23	51.04	1174.00	436.000	-2.671	.008	-.29
	Female	58	37.02	2147.00				

\*See table 3 for statements

**Statements Regarding Sd and its Importance:** The results of the statements section, which was concerned with the importance, place and future of SD, were quite encouraging; 91.3% of the respondents agreed or strongly agreed that “SD is an important subject, especially for the future of society”. Another 88.8% thought that SD should be given more emphasis at all levels of education in Turkey. Of the students who took the survey, 90.1% disagreed or strongly disagreed with the statement that “SD is related to decision makers and does not interest common people” while 92.5% of the students think that there is a need for SD to create better world. It is encouraging to see that students are expressing their willingness to take actions for SD by disagreeing or strongly disagreeing with the statement, “There is nothing I can do to promote SD”. Likewise, 57.4% of the students disagreed or strongly disagreed that SD has been given enough emphasis in Turkey.”

Mann-Whitney *U* tests were used to assess the statistical significance of gender to students’ levels of agreement to the statements regarding the importance and future of SD. Significant differences were found in the mean ranks of males and females on the first and third statements. The 22 male students polled had significantly higher mean ranks (54.84) than the 58 female students (35.06) on the first statement related to importance of SD. Likewise, the 23 male students had significantly higher mean ranks (51.04) than the 58 female students (37.02) who responded to the third statement regarding the place of SD in education. According to Cohen [26], *r* values indicate that the effect size is medium to large for statements one and three (Table 4).

## DISCUSSION AND CONCLUSION

The students’ answers to the question “How do you rate your knowledge of the environmental issues provided?”, which constitutes the second part of the survey, corresponds with the statement “I have some knowledge”, the average score being 3.16 out of 4. This score seems to be high and it can be concluded that students are knowledgeable about environmental issues. It is interesting that the majority of participants claimed that they “know a lot” about the environmental issues “air pollution” and “deforestation”. These are the two most vital environmental problems that face the big cities and woodlands of Turkey and for which all stakeholders, including policy makers, NGOs and individuals, are seeking a solution. However, “salinity” and “solid waste” were the issues on which students scored lowest, indicating that the issues that do not have a nationwide reputation draw lower interest from students.

As the results show, significant statistical differences exist between gender and the self-ratings of the students’ knowledge about environmental issues one and eleven. According to these results, male students think that they are more familiar with the issues “acid rain” and “salinity” than female students do (Table 1).

The self-ratings of the students regarding SD issues show that they rate their knowledge in between “Heard but could not explain” and “I have some knowledge”. With the average score of 2.5 out of 4, this actually means they have little knowledge. In this section, population growth, the connection between social problems and degradation of the environment, social

responsibility, inter-generational equity and definition of SD were among the SD issues that students believe they have more knowledge of than issues such as earth's carrying capacity, actions that can be taken by universities and students to promote SD and stakeholders' participation. Based on the results of the Mann-Whitney U tests, there appears to be no significant gender difference in the self-reported responses to issues regarding SD.

As for the matching activity, the results are highly discouraging; just six students could match all the given international events with their relevant subjects, showing that students have little background knowledge of events related to SD. Results also indicate that students are most familiar with Kyoto Protocol as an event related to climate change; 42% of all participants, including the ones who did not complete the activity, matched these two correctly.

Seventy of the students correctly answered the question regarding the definition of SD. It is interesting that more than 85% of participants succeeded in identifying the basic definition of SD, in light of the fact that only 58.5% (n= 48) of them indicated that they "[had] some knowledge" or "[knew] a lot" about the definition of SD. This information, however, does not represent a discrepancy because 23.2% of the students stated that they had heard the definition but could not explain it. In a multiple-choice format, they could have easily remembered the definition by looking at the choices. However, students' failure to identify the fundamental components of SD (economy, environment and society), with more than 40% of participants answering incorrectly, shows students' insufficient background knowledge of the components of SD. Answers to the questions regarding students' educational background in SD suggest that students had almost no background in terms of attending any SD related activity or receiving sustainability education in their primary and secondary schools.

The students' level of agreement to the statements about SD and its importance shows that students have positive attitudes towards SD, its importance and its place in education in spite of having insufficient educational background and knowledge levels. Results suggest that the majority of the students think that SD is important for now and for the future, that more room should be allocated for SD at different levels of education, that it interests all society and, most importantly, that there is something they can do to promote SD, showing that they are ready to take responsibility for SD even if they stated

that they do not know what to do. However, almost 58% of them think that SD is not given enough emphasis in Turkey.

In addition to the encouraging results from the responses of the students, Mann-Whitney U tests indicate that male students differed significantly from female students on the first and third statements. According to the statistics, male students believe in the importance of SD more than female students. Likewise, more male students than female students think that SD should be given more emphasis at all levels of education in Turkey (Table 4).

**In Conclusion, the Following Remarks Can Be Underlined:** On average, students appear to be relatively knowledgeable about environmental issues, but the knowledge and understanding of students about SD is not satisfactory.

Students have significant knowledge gaps regarding SD issues like stakeholders' participation, actions that can be taken to promote SD and earth's carrying capacity.

Students are familiar neither with the components of SD nor with international events related to environment and SD, including the Kyoto Protocol, the Brundtland Report and the Florence Convention.

There is a significant problem regarding the previous SD education of Turkish students. Almost all of them indicated that they had not received any SD education in their primary and secondary schools. This circumstance is especially relevant to geography-related teaching programs at the primary and secondary level and the need for the practical application of SD in these classes. Teachers in primary and secondary schools must be encouraged to put SD in their teaching agendas.

Almost 97% of the students have not attended any SD activities so far. This shows that SD has not become an important issue on society's agenda.

An encouraging finding of this study is that all of the students who were surveyed think that SD is important for them and their future and, moreover, they are aware of the future consequences of their present activities.

Finally, the findings of this study supports the findings of the previous national and international studies [3, 4, 6, 23, 24] conducted on the similar subjects that although the undergraduate geography students are quite knowledgeable about the environmental problems regarding Turkey and the areas in which they live, they have significant knowledge gaps regarding the term "sustainable development", strategies for SD and its benefits.

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