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Conference Paper · November 2018

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Towards Green Campuses: Students' Perceptions and Expectations

E. Tezel
Istanbul Technical University, Department of Architecture, Turkey
tezele@itu.edu.tr

M. Ugural
Istanbul Kultur University, Department of Civil Engineering, Turkey
m.ugural@iku.edu.tr

H. Giritli
Istanbul Technical University, Department of Architecture, Turkey
giritli@itu.edu.tr

Abstract

The contribution of education to sustainable development has been emphasized many times by education professional, researchers and global leaders. Hence, strategies for quality education were placed among UN Sustainable Development Goals for 2030. In order to ensure effective learning of sustainability, building and upgrading education facilities is as important as teaching of it. Green campus concept, in this scope, is expected to provide a medium to enhance the awareness of students about environment and contribute to their theoretical knowledge about sustainability through practical implementations. Numerous higher education institutions are recently adapting their facilities according to environmentally friendly guidelines while educating their students about environment and sustainability subjects.

The purpose of this study is to understand the influence of education on students' perceptions about sustainability and determine the expectations of students in terms of green campus implementations. In addition to investigate the prevalent green campus practices worldwide, this study analyzes the relationship between students' perceptions about sustainability field and level of sustainability education taken during higher education. Results of the study highlight important perception and expectation differences between international and Turkish students.

Keywords: *expectation, green campus, perception, students, sustainability in higher education.*

Introduction

Increasing concern on environmental issues generates a need for several response strategies by various sectors. In sustainability case, higher education institutions have great responsibility (Foo 2013, Geng et al. 2013) as they "play a leading role in teaching and researching

sustainability issues" (Sharp 2009). Although sustainability in higher education was firstly addressed in Stockholm Declaration in 1972 (Tiyarattanachai and Hollmann 2016), the importance of education on increasing public awareness about sustainable development was strongly emphasized in Agenda 21 (UN 1992), and the 2030 Agenda for Sustainable Development (UN 2015). However, in addition to integrate sustainability education into faculties' curriculum, higher education institutions were recommended to improve their physical assets and continue their campus operations considering to cause minimum environmental impact. Therefore, a myriad of higher education institutions is still trying to take place in the globally emerged green campus movement since 1990s.

Focusing on the relationship between sustainability education and campus implementations, this study aims to understand the influence of education on students' sustainability perceptions and determine their green campus expectation through a questionnaire survey. Findings of this study are expected to enlighten the pathway for more efficient green campus implementations through concentrating on students' views about sustainability and green campus movements.

Green Campuses: Roles and Examples

Sustainable Development and Green Campuses

Sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN 1987) and it refers to guarantee of the balance of economic, social and environmental conditions while making of any development (Tiyarattanachai and Hollmann 2016). Agenda 21, an extensive action plan declared by United Nations, considers education as an important medium for promoting sustainable development (UN 1992). Besides this, higher education institutions were addressed as the most important contributors of sustainable development and expected to continue their educating activities in green campuses to improve their influence on societies' enhancement (Geng et al. 2013, Leal Filho et al. 2015).

Green campus term includes; minimization of negative environmental impacts, generation of public awareness about sustainability as well as fulfilment of teaching and researching functions of higher education institutions (Dahle and Neumayer 2001, Savelyeva and Park 2012, Leal Filho et al. 2015). The roots of green campus efforts extend over 1990s (Sharp 2009, Cavas et al. 2014) and enhancement of these efforts still hold place in the center of global concern.

Green Campus Efforts in the World

Although university campuses cause several environmental impacts (Betts 2001, Lukman et al. 2009), they also provide a platform for the trial of new approaches or methods for sustainability (Leal Filho et al. 2015). Despite the increasing awareness about green campuses, certain barriers against those projects is inevitable. Dahle and Neumayer (2001), for example, define four important barriers for green campuses such as; lack of environmental education, lack of environmental attitude and lack of space for several environmental actions and put lack of financial resources barrier in first place. Later, however, Sharp (2009) claim that greening a campus can be achieved with a reasonable amount of cost and payback itself in a very short run.

As from the first years of green campus efforts, several initiatives and organizations were emerged globally and declared numerous implementations for green campuses. Among these, constructing green buildings into campus or retrofitting existing campus facilities (Betts 2001, Savelyeva and Park 2012), promoting environmentally oriented actions such as energy conservation, water treatment or waste management (Lukman et al. 2009, Sharp 2009, Geng et al. 2013) and adapting sustainability subject into faculties' curriculum (Betts 2001, Dahle and Neumayet 2001, Cavas et al. 2014) are mostly experienced implementations. Today, there are a large number of higher education institutions which have integrated themselves to those constitutions through diverse approaches.

Considering the numerous green campus implementations all around the world, United States and United Kingdom showed the greatest efforts (Leal Filho et al. 2015) and those efforts were followed by many other countries such as, Australia (Sharp 2002), Canada (Fonseca et al. 2011) and China (Yuan and Zuo 2013).

In addition to global examples, Turkey also has several higher education institutions who have started to apply green campus implementations. According to the 2017 rankings of Green Metric, 24 higher education institutions, namely; Istanbul Technical University (ITU), Bulent Ecevit University, Ankara University, Yeditepe University, Sabanci University, Erciyes University, Ozyegin University, Ege University, Bogazici University, TOBB Economics and Technology University, Hitit University, Bartin University, Suleyman Demirel University, Yildiz Technical University, Bilkent University, Ondokuz Mayis University, Düzce University, Inonu University, Kilis 7 Aralik University, Karabuk University, Selcuk University, Manisa Celal Bayar University, Anadolu University and Izmir University of Economics from Turkey were placed among 619 universities with successful scores (Green Metric 2017).

Hence the increasing number of green campus projects in different countries, most studies suffer from the unsatisfactory performance of those efforts. In order to achieve desired success from sustainability programs, students' perceptions (Yuan and Zuo 2013) and willingness to contribute sustainability (Coy et al. 2013) are claimed as the most important factors.

Research Method

A questionnaire survey was developed to collect information for measuring the impact of education on university students' sustainability perceptions and determine students' expectations in terms of green campus implementations. Statistical analyzes of the gathered data were performed with the help of IBM SPSS 21.0 software.

Sample and Data Collection

Data were collected by means of a self-report questionnaire. Using typical case sampling technique, the authors further aimed to investigate how a green campus affects students. The sample consisted of students who have been accommodating in Ayazaga Campus of ITU, which appeared as the highest scored green university of Turkey in the 2017 rankings of Green Metric. A total of 48 students who have been studying engineering or architecture in ITU, in both undergraduate and graduate levels participated in the research. Considering the demographic characteristics of the respondents, it is seen that 56.2% (n=27) of the respondents were Turkish students and the remaining 43.8% (n=21) were from European countries.

Instrument

The survey questionnaire has four sections. Respondents were firstly asked to indicate if there exist any compulsory or selective course focusing on sustainability field in their major and whether they have taken any sustainability course or participated in any activity related with sustainability during their higher education with close-ended (yes/no) questions. In the next section, respondents were encouraged to select any of six sustainable campus implementations (e.g., upgrade of bike or bus/shuttle transportation options, improving energy and water efficiency of campus buildings or more containers for separately collection of various wastes) that they most like to see in their campuses. These six applications were determined according to an in-depth survey of previous studies (Lukman et al. 2009, Savelyeva and Park 2012).

In the third section, respondents were asked to indicate their level of awareness about sustainability issues, level of knowledge about sustainability issues, level of interest about sustainability issues and their level of nature connectedness with a five-point scale (1-poor; 2-fair; 3-average; 4-good; 5-excellent). Finally, in the fourth section, respondents were asked to indicate the frequency that they realize or pay attention to twelve statements adopted from Baer et al.'s (2006) Five Facet Mindfulness Questionnaire (FFMQ) in their daily routine from 1 (never) to 5 (always). Questions in the third and fourth sections were aiming to understand sustainability perceptions of students through investigating both their awareness about sustainability issue in terms of two most relevant subscales of FFMQ (Amel et al. 2009) as observing and acting with awareness items and their self-assessment about their connection with sustainability field.

Cronbach's coefficient alpha was used to calculate the internal consistency of the given responses to the questionnaire and high reliability for the results of the survey was detected (α=.79, Mean=3.74).

Results

Descriptive Analyzes

In order to understand respondents' familiarity with sustainability field, they were asked to indicate whether they have taken any sustainability course or participated in any activity related with sustainability. Then, to determine respondents' perceptions about sustainability, 12 questions measuring observing and acting with awareness dimensions of mindfulness about sustainability were asked to respondents. The responses were shown in Table 1 and Table 2.

Table 1. Course or activity taken about sustainability

	Turkish students		European students	
Did you take any course related with sustainability field at your university?	Yes	%	Yes	%
	24	88.9	8	38.1
	No	%	No	%
	3	11.1	13	61.9
Did you participate in any activity (seminar, workshop, etc.) related with sustainability field?	Yes	%	Yes	%
	19	70.4	11	52.4
	No	%	No	%
	8	29.6	10	47.6

As seen in Table 1, almost all of the Turkish students (88.9%) took sustainability related course during their higher education and most of them (70.4%) also participated in seminars or workshops about sustainability field. However, only a small number of European students (38.1%) took sustainability related course and nearly half of them (52.4%) indicated that they participated in seminars or workshops about sustainability field.

Table 2. Means and standard deviations of study items

	Turkish students		European students	
	Mean	SD	Mean	SD
(1) Sustainability mindfulness	3.86	.403	3.44	.722
(2) Awareness level of sustainability	3.85	.662	3.95	.669
(3) Knowledge level of sustainability	3.78	.698	4.00	.632
(4) Interest level of sustainability	3.93	.781	3.76	.944
(5) Connectedness to nature	3.89	.641	3.48	.814

Table 2, compares mean scores between Turkish and European students participated in this survey. It is interesting that despite European students showed relatively low participation to sustainability courses or activities compared with Turkish students (see Table 1), they indicated their awareness and knowledge level of sustainability relatively higher. On the other hand, Turkish students reported their sustainability interest and nature connectedness relatively higher than other students. These results of Turkish students were supported by their relatively higher mindfulness about sustainability as they scored higher compared with European students.

Inferential Analyzes

Spearman correlation analysis was conducted to determine the influence of education on students' sustainability perceptions. According to the correlation results in Table 3, it can be concluded that, more education on sustainability improves students' nature connectedness which also signals more involvement of students to sustainability focusing activities. On the other hand, it is seen that more mindful individuals show more interest on sustainability issues. Furthermore, strong correlations between sustainability knowledge and awareness and interest signal the importance of various sustainability training platforms for establishment of sustainability concept among university students.

Table 3. Spearman correlations values of study items

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Sustain. mindfulness	1						
(2) Awareness level of sust.	.275	1					
(3) Knowledge level of sust.	.139	.600**	1				
(4) Interest level of sust.	.315*	.184	.375**	1			
(5) Connectedness to nature	.122	.119	.191	.237	1		
(6) Sustain. course taken	.131	-.107	-.124	.100	.356**	1	
(7) Sustain. activity taken	-.199	-.061	-.004	.090	.139	.456**	1

*$p<.05$, **$p<.01$

Mann-Whitney u-test analysis was conducted to determine green campus expectation differences between Turkish and European students. Considering the given responses to question of "what sustainability projects would you most like to see on your campus?", Table 4 shows low but statistically significant ($p<0.1$) differences between students in terms of use of e-resources during classes ($p=.082$), disposal opportunity for different types of wastes ($p=.067$) and sale of local food and beverage in campus ($p=.078$). Additionally, it is found that, having more water efficient campus buildings expectation of Turkish students is significantly higher ($p=.004$) than others.

Table 4. Mann-Whitney u-test results of green campus expectations of students

Variable	N	Mean Rank	Sum of Ranks	Sig.
Bike or bus/shuttle transportation in campus				.150
Turkish students	27	26.72	721.50	
European students	21	21.64	454.50	
Increasing use of e-resources during class				.082
Turkish students	27	26.89	726.00	
European students	21	21.43	450.00	
Energy efficient campus buildings				.476
Turkish students	27	23.50	634.50	
European students	21	25.79	541.50	
Water efficient campus buildings				.004
Turkish students	27	28.22	762.00	
European students	21	19.71	414.00	
Proper bins for various waste types				.067
Turkish students	27	27.17	733.50	
European students	21	21.07	442.50	
Local food/beverage sale in campus				.078
Turkish students	27	21.78	588.00	
European students	21	28.00	588.00	

Discussion and Conclusion

Findings of this study reveal the positive influence of higher education on sustainability perceptions of university students and supported by the previous studies of Dahle and Neumayer (2001), Geng et al. (2013) and Yuan and Zuo (2013). Furthermore, considering the sustainability education differences of respondents, green campus expectation differences between two groups were also expected and attained. In addition to observed similarities between findings of this study and current green campus literature, the limited number of survey responses cannot be blamed because the Cronbach's alpha value of the survey demonstrated a reliable outcome ($\alpha=.79$).

Higher education institutions have not only the responsibility of vocational education, but also the responsibility of guidance of society. Universities provide a medium for both knowledge generation about sustainability issues and technology development to overcome environmental problems. It is important to note that, university students are the future leaders (Geng et al. 2013) and consequently, they should be accepted as the pillars of sustainable development of nations (Yuan and Zuo 2013).

It is clear that, adapting sustainability issues into faculties' curriculum, as a requisite of green campus implementations, has positive contributions on students' nature connectedness and awareness about environmental problems, accordingly. However, more involvement of faculty staff, academics and especially students to green campus efforts are accepted as more effective environmental achievement (Dahle and Neumayer 2001, Yuan and Zuo 2013). In order to gain success in campus greening efforts, higher education institutions should consider expectations of students who have sustainability education and provide them an opportunity to participate green efforts priory.

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