

Going green all the way – an empirical study about inculcating sustainable and responsible behavior in the students of University of Debrecen

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ABSTRACT

Universities in a country play a pivotal role in the development of society. It serves as a beacon for people attending the university. Universities, these days are focusing on several areas which have become the need of the hour. One of them which tops the list is campus sustainability. The study will be conducted at the University of Debrecen and measures the impact of university's role in sustainable development on campus sustainability with moderating role of student's sustainability involvement and responsible behavior. The study emphasizes on the importance of sustainability at university and what factors are necessary to enhance it. No matter how much effort and infrastructure a university builds to maintain and build sustainability at campus, it cannot be successful until the entire campus community shows intent and strives to practice it. The findings of the study are expected to establish the fact that responsible behavior and student involvement will bring fruitful results in achieving sustainability at campus. The aim of the study is to inculcate the sense of responsibility and to emphasize that sustainability is everyone's business. Random convenience sampling will be used and data will be collected quantitatively from students of University of Debrecen and will be analyzed statistically. The findings of the research can be generalized for other institutions across Europe.

Keywords: campus sustainability, sustainability development, student's sustainability involvement, responsible behavior. JEL Code: I24, I25, Q01, M14

1. Introduction

One of the most critical challenges ever faced by mankind is addressing the existing state of global environment. The tremendous growth in population, the industrialization and the economic activities as well as the consumption patterns associated with it have brought this world to a stage where it faces extreme environmental pressures. The environmental crisis that is being emphasized is wide-ranging which includes but is not limited to scarcity of resources, increase in pollution, loss of biodiversity and habitat (Sharp, 2002). As the industrialization is growing side by side with human development, it is resulting in huge level of emission of gases like carbon dioxide, methane, nitrous oxide and several more through the combustion of fossil fuels. These emissions contribute majorly to the climate change which adversely affects our planet. The staggering perspective of researchers is that associations, ventures and governments must embrace sustainable practices and initiate alleviation activity to

forestall further degradation, to minimize carbon dioxide and methane emissions and to foresee further expansions in discharges so as to limit these effects (Stern, 2006).

Universities play a pivotal role in curbing environmental pressures and in establishing a sustainable society because research, education and community involvement can have long-lasting on society and environment (von Oelreich 2004). Higher education institutions (HEIs) can play a pivotal role in promoting a more sustainable society (Disterheft et al., 2013). Numerous HEIs have focused on the inculcation of sustainability issues into their educational program by receiving presentations of sustainability (Filho et al., 2019). In this age, the biggest mission of any university is to provide an active role in achieving sustainability in society (Yuan et al., 2013). Universities greatly impact sustainability by internal (i.e. campus sustainability, sustainability policy, environmental initiatives, curriculum, and research) and external (i.e. universities' role in the region) performances (Dagiliute & Liobikiene, 2015). Therefore, universities ought to participate in sustainability both internally and externally. As organizations, universities have the biggest contribution in building character and personal identity for the student (Dagiliūtė et al., 2018). In this manner, the significance of universities for their role in carving the future changes for the formation of sustainable society are widely recognized and imagined (Beynaghi et al., 2016). Similarly, University of Debrecen has been striving towards development of a sustainable environment at its campuses for several years. It has taken a lot of steps to ensure sustainability and mold the mind set of students and overall community towards building a sustainable environment. From a theoretical perspective, scholars have stated that when a university implements sustainability throughout all these dimensions, it may be considered “sustainable” or, with a similar meaning, “green” (Dagiliute et al., 2018).

2. Literature Review

Campus Sustainability

The debate of the need to incorporate sustainability issues in higher education institutions dates back to the 1990's, after Brundtland Report defined what now is known as the Sustainable Development concept (Brundtland, 1987).

If we define sustainability, it is based on three pillars, as higher education institutions have the duty to contribute towards alleviating natural, monetary and cultural effects, while advancing wellbeing and prosperity and spreading these qualities universally (Alshuwaikhat & Abubakar, 2008; Velazquez et al., 2006). The aspects of sustainability may be echoed in the HEI setting to comprise: a) Education, including all the actions related to knowledge transmission, such as curriculum, research and behavior change; b) Operations, related to the physical built environment; and c) Governance, comprising the administration of university resources, either human or material, and the engagement with the community (Dagiliute et al., 2018). The requisite to consider sustainability in academic institutions is twofold. Firstly, universities can be considered as “small cities” which may have heavy impacts on the environment due to their activities, movement of goods and persons inside campuses (Alshuwaikhat & Abubakar, 2008). Universities can be seen as sophisticated buildings, because they manage waste generation, materials and water consumption, transportation, electricity and energy consumption, considering the technical, societal and informative activities that happen within their boundaries (Alshuwaikhat & Abubakar, 2008). Keeping in view all these aspects, it is impossible to ignore

campuses' impact on environmental quality and integrity (Ragazzi & Ghidini, 2017). Secondly, higher education institutions play a pivotal role in society, in the development of upcoming generations and to prepare future professionals in line with the concept of moving towards sustainability (Corcoran & Wals, 2004, Disterheft, et al., 2013).

There are several definitions of sustainable universities. Velazquez et al. (2006) define a sustainable university as “a higher educational institution, as a whole or as a part, that addresses, involves and promotes, on a regional or a global level, the minimization of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfill its functions of teaching, research, outreach and partnership, and stewardship in ways to help society make the transition to sustainable lifestyles”. According to Alshuwaikhat and Abubakar (2008) “sustainable university campus should be a healthy campus environment, with a prosperous economy through energy and resource conservation, waste reduction and an efficient environmental management, and promotes equity and social justice in its affairs and export these values at community, national and global levels”. The definition refers to the triple-bottom-line theory of sustainability, which states that a sustainable institution has to protect the environment, ensure social justice and support economic growth simultaneously.

The role of education is critical for sustainable development and is now recognized globally. Credit goes to United Nations Millennium Development Goals and the European Union Sustainable Development Strategy which have placed universities in the forefront as the most effective catalyst of sustainability principles (Lukman & Glavič, 2007). Therefore, it is an obligation for all higher education institutions to cascade sustainability principles down the chain.

Responsible Behavior

Education related to preservation of environment is essential, the ultimate goal of which is the development of environmentally responsible citizens (Hungerford & Peyton, 1976). Behavior is thought to be environmentally responsible when the tasks an individual or group engage into reflect the sustainable or moderated use of natural resources (Sivek & Hungerford, 1989). Efforts to comprehend and forecast why individuals act in an environmentally appropriate manner have produced a large body of literature.

Environmentally responsible behaviors include practices that usually add to the overall environmental well-being (Atshan et al., 2020). This definition builds on the definition of environmental behavior as “broadly all types of behavior that change the availability of materials or energy from the environment or alter the structure and dynamics of ecosystems or the biosphere” (Steg & Vlek, 2009). Environmentally responsible behaviors research pursues to recognize and understand the factors that are projecting environmentally responsible behaviors. Such factors, in turn, offer leverage points for policy development to be laid down to direct environmental sustainability behaviors (Ávila et al., 2020). Initial research attempted to demonstrate that environmentally responsible behavior is moved by a mixture of self-interest causes, concern for other objects (people, future generations, environments), social, and demographic factors (Axelrod & Lehman, 1993; Hines et al., 1987; Van Liere & Dunlap, 1980). Additional waves of research focused on psycho-social variables and

categorized them into four groups or factors: attitudinal factors, contextual factors, personal capability factors, and habitual factors.

Student's Sustainability Involvement

Studies on students' comprehensions about sustainability typically focus on the general perceptions regarding personal responsibility and climate change (Eagle et al., 2015). Despite the fact that understudies could give creative thoughts or recommend and add to the upgrades as far as uplifting the performance of universities in concerned, the research on student's interest in campus sustainability is under researched. Abd-Razaka et al. (2011) discuss the planning of campus development based on the perception of its students. They found that the students highlighted the "weak" areas e.g accessibility, inappropriate lighting and security on the campus. These can form key deliverables for the management to build sustainability. Furthermore, Nejati and Nejati (2013) also studied sustainability practices at the campus by wearing the hat of a student. Built on students' observations, they recommend considering four builds for estimating campus sustainability measures: sustainability, community outreach, assurance and monitoring, energy and waste, and planning the use of land effectively. Observing what students prefer when it comes to sustainability development education, Yuan and Zuo (2013) emphasized that the most dominating factors were environmental ones.

In like manner, the requirements for having a sound supportability training framework are dynamic cooperation and association in functions occurring in the college. While introducing a model for maintainability appraisal in advanced education. Blend of the whole college civil, understudies enveloped, participating in the maintainability exercises brings about duty, possession, obligation and genuine effect. Velazquez et al. (2005) specified that a lack of involvement is a factor negatively impacting sustainability at higher education institutions. Having said that, the bottom-up initiatives, especially the ones lead, could serve as the most important drivers in bringing change in university operations (Brinkhurst et al., 2011). However, the insertion of the entire community in sustainability related activated is limited because of the stagnant infrastructure and very less input and zeal from administrative staff of the university (Avila et al., 2017). One of the reasons for this is also lack of knowledge and awareness about sustainability given to university staff. Brinkhurst et al. (2011) proposed that cascading down the information effectively and then assessing these initiatives can actually win people's commitment to change. Additionally, universities could act as knowledge hubs from where information is sent to all stakeholders using different internet tools (Katiliute & Daunoriene, 2015). Although universities currently are missing out on the opportunity of creating awareness about sustainability to the prospective students (Timothy et al., 2015).

Involvement also enhances the leadership ability of the students (Elizabeth & Michael, 2013). A leader not only uplifts his/her own spirit and working condition, rather provides good environment for his subordinates as well. When students are given responsibility to take charge of a certain task or responsibility, they build a tie with their team mates. This imperceptible tie between a leader and his teammates is responsible for channelizing emotions in a positive direction which results in team delivering their best. This state is called resonance. A study by Karpudewan et al. (2015) presented that energetic student involvement in the classroom had amplified students' understanding of greenhouse effect, global warming and ozone exhaustion. Contact with nature outside the classroom can build leadership, confidence, problem solving in the classroom, (Seyedehzahra et al., 2011).

However, there are also other factors which that influence the positive environmental knowledge of students and that is is their parents, family norms, media, teachers, and the list goes on (Zarrintaj et al., 2013). In addition, compelling training approaches can likewise assist with improving the student's degree of environmental knowledge proficiency (Mageswary et al., 2016).

3. Sustainability

The term 'sustainability' is primarily associated with the environmentally conscious actions, the saving of resources and the renewable raw materials (Nuremberg Institute for Market Decisions, 2016).

However, sustainability is a more complex term, which consists of economic, ecological and social perspectives. In case of economic sustainability, importance is attached to the ensuring of a company's sustainable production in the future besides, its economic success. Ecological sustainability includes the attempt to handle the resources in a way that they remain available to the new generations to the same extent as now. Social sustainability means that companies treat their stakeholders in a way that they remain constantly willing to cooperate (Clausen, 2009).

Since the definition of sustainability is not adequately defined, for companies, it leaves a wide scope to interpret it. As a result, market participants are free to define their own terms of sustainability. Thus, the same term does not meet the same requirements. However, the aim of the term's use is to distinguish sustainable from less sustainable developments (Grunwald, 2004).

Sustainability is a prerequisite for ethical action, which can be achieved by improving economic, social and environmental compatibility, as well (Zerres & Zerres, 2014). Today the aim of ethics is to show consumers how to act sustainably. Consumers no longer want to consume thoughtlessly, but to consciously control their consumption. Instead of a throw-away society, people want to use the system in a way that makes it available in its present form for future generations, too ("Neo-Ökologie – Der wichtigste Megatrend unserer Zeit", 2019).

4. Research Objective

The main objectives of this research are to:

- Study how the students' responsible behavior and their sustainability involvement influence the
- Inculcating responsible behavior and involvement of students in campus sustainability drive.

5. Research Question

A lot of literature have been published regarding the sustainability of universities and the steps universities are taking towards achieving sustainability. The question lies what kind of behaviors and attitude is required by students to make the efforts done by universities fruitful. How will universities achieve a green university level and what steps do the university community need to take to actually reach there?

6. Theoretical Framework

The concept of sustainability is historically based on the triple-bottom-line theory: the three spheres – social, economic and environmental – have the same importance and they are strongly interconnected. Development must ensure the integration among economy, society and environment to be considered sustainable, achieving balance between them. A similar model is also used for sustainable universities. The triple-bottom theory is the underlying theory and forms the conceptual framework of this paper. The framework proposes that sustainability at university will only be impactful if social, economic and environmental aspects are covered in the shape of responsible behavior, and student’s sustainability involvement and university’s own role in building sustainability.

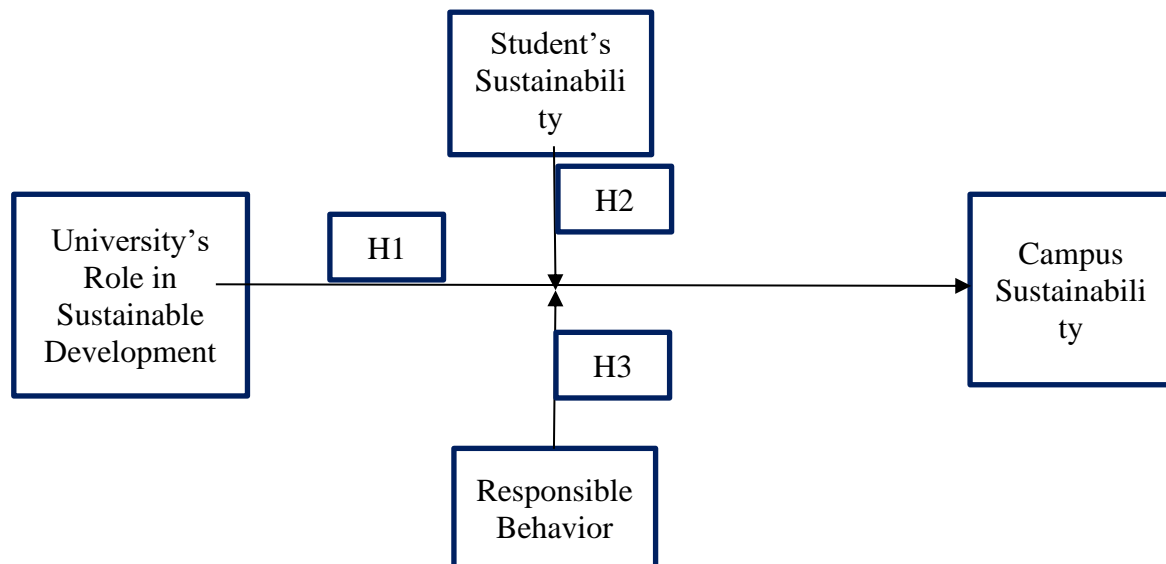


Figure 1: Conceptual Framework

H¹: There is a significant impact of university’s role in sustainable development on campus sustainability.

H²: The student’s sustainability involvement significantly moderates the relationship between university’s role in sustainable development and campus sustainability.

H³: The responsible behavior of students significantly moderates the relationship between university’s role in sustainable development and campus sustainability.

7. Materials and Methods

We have considered students aging from 18-26 above years from all faculties of the University of Debrecen. Snowball sampling technique was used and 306 responses were recorded SPSS has been used for data tabulation and analysis. Data has been collected through primary research. It took almost two weeks to complete data collection. The questionnaire has been adopted using 4 separate research instruments already used by researchers to measure these 4 variables. The constructs of campus sustainability, university role in sustainable development and student’s sustainability involvement have been used in a previous research and been measured (Dagiliūtė . et al, 2018). The constructs of environmentally responsible behavior have been adapted from a previous research (Vaske & Kobrin, 2001).

8. Analysis

Three separate models have been used. The first one measures the influence of independent variable on the dependent variable, the second model measures the same impact in the presence of the first moderator variable and the third model measures the impact in the presence of second moderator. All three models are linear in nature since the data collected through Likert scale questionnaire.

Student Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	170	55.6	55.6	55.6
	Male	136	44.4	44.4	100.0
	Total	306	100.0	100.0	

Table 1: Frequency Table- Student Gender

Student Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-20	23	7.5	7.5	7.5
	21-23	67	21.9	21.9	29.4
	24-26	196	64.1	64.1	93.5
	More than 26	20	6.5	6.5	100.0
	Total	306	100.0	100.0	

Figure 2: Frequency Chart- Student Age

Table 1 shows the percentage of male and female students who have successfully participated in the survey. It can be seen that the percentage of female student was more who shared their responses. Table 2 shows the age group of students who participated. The biggest count of students participating in the survey had ages between 24-26.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.680	0.703	4

Table 3: Instrument Reliability

Table 3 shows the reliability of the instrument as a whole with a cronbach's alpha value of 0.68. Any value between 0.6-0.7 is considered acceptable consistency between items.

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.556 ^a	0.310	0.303	1.49128	0.310	45.132	3	302	0.000	1.748

a. Predictors: (Constant), M2, IV, M1

b. Dependent Variable: DV

Table 4: Autocorrelation Summary

Table 4 gives the summary of the regression analysis performed on the set of variables. The Durbin Watson value of 1.74 indicates a positive autocorrelation in the residuals from the statistical regression analysis performed. As we know that R Square value provides information regarding goodness of fit for the linear regression model, the 0.310 value depicts moderate fit of the linear model and is in the acceptable range.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.660	0.810		4.519	0.000
	IV	0.257	0.041	0.337	6.244	0.000
	M1	0.355	0.071	0.282	5.021	0.000
	M2	0.061	0.045	0.070	1.364	0.173

a. Dependent Variable: DV

Table 5: Path Coefficients

Table 5 determines the significance of the relationship among variables. We can see that there is a positive significant impact of IV and M1 on dependent variable. However, there is no significant impact of M2 on dependent variable.

9. Results and Findings

Hypothesis 1: There is a positive significant impact of university's role in sustainable development on campus sustainability. This depicts that the university's effort in sustainability development will actual help campus become sustainable in real sense.

Hypothesis 2: The student sustainability involvement has a significant moderating impact on the relationship between university's role in sustainability development and campus sustainability. If the student's involvement in sustainability development increases, the stronger is the impact of university's sustainability role on campus stability.

Hypothesis 3: The environmentally responsible behavior does not have a significant moderating effect on the relationship university's role in sustainability development and campus sustainability. The demonstration or lack of environmentally responsible behavior doesn't strengthen or weaken the impact of university's role in sustainability development on campus sustainability.

10. Conclusion

Achieving sustainability is essential for all higher education institutions in this age. It is a game changer and the future of education and societal prosperity. With the increase in population, fast consumption of resources, emission of harmful gases due to a rise in industries, sustainability development is the only step towards building a better place for our generations to come. Concept of green university as already discussed in this article is the latest research area in the education and institutions across the globe are finding ways to be listed in the green universities list. University of Debrecen is marching steadily towards this destination and with the infrastructure, mindset of the university community and out of the box approach which students have, it will be able to reach there. This study not only highlights areas of focus for University of Debrecen with respect to sustainability, the literature and findings can be generalized for any university in any country.

The research conducted has been the first step of an entire project in which sustainability is determined and also factors are studied which effect sustainability at campus. The second phase will include the faculty, administration staff and all employees working in the university. This will a deeper insight into the steps taken towards building a sustainable campus and what factors may adversely affect it. The third phase of this project will be to encompass the views of the citizens living in Debrecen. This is to include their views about how University of Debrecen is impacting their lives and how the sustainability steps taken by university are impacting their lives. It is important to investigate all the aspects in order to identify the barriers and drivers of sustainability in campus. There have been some limitations in this research. The first and the foremost was Covid-19 due to which self-administered questionnaires couldn't be filled. Secondly there was a time constraint because of which responses were not as much as planned. The quality of data would have been much better if all the campuses of University of Debrecen could be covered and uniformity of responses representing the population of each campus could be ensured. Universities embarking on this journey need to realize that building a sustainability infrastructure is not enough; an environmentally responsible behavior and complete involvement of the students as well as the entire community inside and outside the campus in this resolution will make it a success.

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Annexure 1

	Strongly Disagree	Disagree	Agree	Strongly Agree
IV University's Role in Sustainable Development				
University contributes to energy and resource saving	1	2	3	4
University contributes to social well-being, tolerance (e.g., gender, race, religion equality), fulfilment of needs of the disabled, social activities	1	2	3	4
University contributes to environmental education, ecology, environmental activities	1	2	3	4
University cooperates with other national and foreign universities and businesses	1	2	3	4
University contributes to inclusion of sustainability aspects in study programmes	1	2	3	4
University promotes sustainability research	1	2	3	4
DV Campus Sustainability				
University has active environmental student organization(s)	1	2	3	4
University encourages use of public transport, bikes	1	2	3	4
There is a possibility to recycle waste at the university	1	2	3	4
There is a possibility to use one's own non-disposable cup for coffee	1	2	3	4
M1 Student's Stability Involvement				
I take part in environmental activities organized by the university	1	2	3	4
I take part in social activities organized by the university	1	2	3	4
I am actively involved in activities at the university	1	2	3	4
M2 Environmentally Responsible Behavior	Rarely	Occasionally	Frequently	Usually
About how often have you tried to learn what I can do to help solve environmental issues?	1	2	3	4
About how often have you talked with others about environmental issues?	1	2	3	4
About how often have you tried to convince friends to act responsibly towards the environment?	1	2	3	4
About how often have you joined in community clean-up efforts?	1	2	3	4
About how often have you conserved water by turning off the tap while washing dishes?	1	2	3	4