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Evaluation of Sustainable University Campuses and Sports Facilities from the Perspective of Administrators and Students: A Multiple Case Study

Kadir ÇALIŞKAN[1], Veli Onur ÇELİK[2]

[1]Bitlis Eren University, School of Physical Education and Sports, Bitlis, Turkey
https://orcid.org/0000-0001-7794-5991
[2]Eskisehir Technical University, Faculty of Sports Sciences, Eskisehir, Turkey
https://orcid.org/0000-0002-7865-6531

Email: kcaliskan@hotmail.com , onurcelik@eskisehir.edu.tr

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Abstract

Sustainable higher education institutions contribute to the building of a sustainable society at regional and global levels by raising individuals with environmental awareness. Universities can also offer their stakeholders the opportunity to lead a healthy life with the sports fields on their campuses In this context, the "campuses" and "sports fields" of 6 Turkish universities which are in the top ten of the UI GreenMetric list (ranked by country), were analyzed in a holistic structure with a qualitative paradigm in terms of sustainability officers, sports facilities managers and students. The research was designed in a case study pattern and supported by in-depth interviews and document analysis. In this direction, it was analyzed within the scope of themes and sub-themes with the descriptive analysis method. As a result of the findings, it has been found that the sustainability studies in the examined universities are mainly carried out on environmental sustainability such as energy, water and waste management. It has been revealed that the reason for this for legal obligations. In addition, it has been determined that the sustainability initiatives of private universities are carried out both with various sustainability rating systems (STARS, THE, etc.) and within the framework of an integrated program with students. The inclusion of the opinions of the participants of different statuses in the study enabled us to reach multi-dimensional findings and results in the research fields.

Keywords: Sustainability, Higher education, Green campus, Sports fields, UI Greenmetric

Introduction

One of the most pressing issues of our time; damage to universal ecological capital, such as climate crises, reduced clean water resources, habitat destruction, and desertification of agricultural lands, is a shared concern for leaving a livable world to future generations (UNEP, 1972). Since environmental problems are the common problem of all humanity (Ana-Maria, 2013), it has become an absolute necessity for international organizations and states to shape their future policies with a sustainable and environmentalist understanding in order to ensure the living opportunities of future generations and to sustain human civilization.

UNESCO's 1998 definition of a framework for universities (UNESCO, 1998) increased universities' societal responsibilities (Leal Filho, 2011). Following this development, universities (Alshuwaikhat and Abubakar, 2008), which house large communities and are considered micro-cities, have emerged as one of the players expected to keep up with the transformation by being inspired by sustainable urban models (Finlay and Massey, 2012; Hamon et al., 2017; Zutshi, Credo and Connelly, 2019). On the other hand, among the duties and responsibilities of universities, besides educational activities; there are also some functions such as accommodation, transportation, rest and recreation on campus for students, administrative and academic staff (Erkman, 1990 as cited in Pouya et al., 2019). Sports and recreation areas are the most important element that campus residents can use as a means of socialization. Besides, in the reports of the United Nations, sports are positioned as a tool for sustainable development (United Nations, 2015a; United Nations, 2017). In this direction, entertainment, recreation, and sports activities should be planned with a holistic sustainability model in environmental, economic, and social dimensions in the sustainable campus system (Gibson et al., 2008; Casper and Pfahl, 2015; McCullough and Kellison, 2018).

In the literature, there are many studies in which the environmental effects of sports activities and the sustainability of sports facilities are evaluated (Gibson et al., 2008; Koçak and Balcı, 2010; Mallen et al., 2010; 2014; Mallen and Chard, 2012; Trendafilova, Kellison and Spearman, 2014; McCullough, Pfahl and Nguyen, 2016; Yüce, Katırcı and Yüce, 2020). However, the number of studies specific to sports facilities of universities is very limited. Stinnet and Gibson (2016a and 2016b) in their study, through sustainable initiatives of a recreational sports facility in the education campus; proved to provide several benefits. Pelcher and McCullough (2019) investigated sustainability in sports through a case study of a university's sports facilities in the United States. Schumacher (2016), on the other hand, stated in his study in which he examined the environmental sustainability efforts of sports facilities in small residential areas (university) that a lack of funding is a significant barrier; additionally, it revealed a fundamental lack of understanding of environmental sustainability.

The purpose of this study is to assess the sustainability studies of some Turkish universities in the UI GreenMetric 2021 ranking in terms of environmental, economic, and social factors. Furthermore, it has been investigated whether the sports facilities and recreation areas on these universities' campuses adhere to the sustainability principles.

Sustainability and Sustainable Development

The concept of sustainability can be traced back to the middle ages (Campbell, 1996) and even to Greek mythology (O'Riordan, 1998). However, it can be stated that it first appeared concretely in literature in the 18th century. The first attempts were laws enacted in the Baden region of Germany to prevent the destruction of Black Forests (Schwarzwald) (Wiersum, 1995; Warde, 2011; Grober, 2012). Arthur Young's book "General View of Agriculture of Hertfordshire", published in 1804, mentions the increased productivity as a result of the

change in the cultivation system of agricultural lands, which he observed during his travels in the British Isles (Juchau, 2002). Arthur Cecil Pigou, in his works titled "*Wealth and Welfare*" in 1912 and "*The Economics of Welfare*" published in 1920, started to give the first signs on the idea of sustainability in the modern age (Pigou, 1912, 1920). Ricker (1958) brought the idea of sustainability to the agenda in the field of fisheries with the concept of "maximum sustainable product". The study named "Silent Spring" published by Rachel Louise Carson in 1962 led to the focus on the damage caused by the industrialization processes to the environment and environmental concerns to come to the fore again (Carson, 1962). The most striking of these developments is the controversial book "*The Limits to Growth*", published by a non-governmental organization called Club of Rome in March 1972. This book contains a report that underlines the fact that the world's natural resources are limited and non-renewable (Meadows et al., 1972). Eventually, with the publication of the Stockholm Declaration in 1972, the World Conservation Strategy (WCS) report in 1980, and the report "*Our Common Future*" in 1987, the concepts of sustainability and sustainable development/development gained official usage (WCED, 1987). Sustainable development, according to the report *Our Common Future*, is defined as "meeting the needs of the present generation without jeopardizing future generations' ability to meet their own needs" (WCED, 1987:73). This definition established a framework for understanding the concept of sustainability and sustainable development that is still in use today.

The sustainability model accepted today is based on three pillars: environmental, economic and social. According to Levett (1998), with the name "Russian Dolls"; there are three rings nested with each other (Nested Model), and it is stated that the environmental dimension plays an inclusive and encompassing role in the outermost ring of the model. The social dimension is in the middle ring, and the economic dimension is in the innermost ring. This model is expressed as "strong sustainability" by Giddings et al. (2002).

Sustainable University and Sports Fields in Campuses

A maintainable university is a higher education institution that works to reduce the negative environmental, economic, and social effects of its activities while also guiding society toward a more sustainable way of life (Velaquez et al., 2006:812). The "Belgrade Charter," which was presented at the end of the "International Environmental Education Workshop" held in Belgrade in 1975 under the auspices of UNESCO, is regarded as a watershed moment in the development of the concept of a sustainable university. However, the declaration prepared by the Association of University Leaders for a Sustainable Future (ULSF) in 1990 and known as the "*Talloires Declaration*" was recorded as the first report showing that universities can be involved in sustainable development beyond environmental education (ULSF, 1990; Sharp, 2009). Sustainability developments in higher education institutions have been strengthened with the U.N. declaring 2005-2014 the decade of education for sustainable development.

As universities' understanding of how to be in harmony with sustainable development has grown some rating systems have emerged in which universities are classified based on their sustainability levels. The first is UI GreenMetric was established in 2010 by the University of Indonesia. The ranking aims to highlight universities' sustainability programs and policies around the world, as well as to encourage university sustainability research (Suwartha and Sari, 2013). The rating system has 6 main criteria. These are the collection of basic information about the size of the university and its residential location (urban, suburban, and rural), electricity consumption due to its link to the carbon footprint, waste management, water use, transportation and education-research (UI GreenMetric, 2022).

According to Erkman, the functions of campuses include work, lodging, recreation, and transportation (Erkman, 1990 as cited in Pouya et al., 2019). As you can see, when the campus is mentioned, rest and recreation functions are included among the basic functions. Similarly, in Cole's study, the sustainable campus system was evaluated under two themes as human and ecosystem. The sub-theme of health and good life is included in the human theme and includes recreation (Cole, 2003:41).

In the light of the whole information, the research questions that arise are as follows:

RSQ-1. *How is sustainability initiatives carried out on sustainable university campuses in Turkey?*

RSQ-2. *What is the status of sports facilities and recreation areas on sustainable university campuses in terms of environmental, economic and social sustainability?*

Material and Method

Research design and details of participants

This study was conducted with the case study design, which is one of the qualitative research methods, to explain the cases in a multi-dimensional and in-depth manner (Creswell, 2002). Since there is more than one university campus and there is more than one analysis unit specific to each campus, the research is in an embedded multiple-case design (Yin, 2003). For determining the research areas, the criterion sampling method, which is among the purposive sampling models, was used (Patton, 2002).

Table 1. 2021 UI Greenmetric Scores of Selected Universities

		Universities	Indicators						
Turkey Ranking	**International Ranking**	**University**	**Total Points (10.000)**	**Structure and Substructures (1.500)**	**Energy and Climate (2.100)**	**Wastes (1.800)**	**Water (1.000)**	**Transportation (1.800)**	**Education and Research (1.800)**
1	57	Istanbul Technical University (S)	**8150**	1225	1400	1575	900	1400	1650
2	91	Özyeğin University (P)	**7850**	975	1525	1425	800	1450	1675
5	108	Ege University (S)	**7725**	1125	1300	1575	800	1425	1500
7	115	Yeditepe University (P)	**7700**	1025	1225	1575	800	1500	1575
9	127	Middle East Technical University (S)	**7650**	1325	1075	1200	850	1400	1800
18	309	Zonguldak Bulent Ecevit University. (S)	**6625**	1050	1200	1275	700	1450	950

**S: State University; P: Private University*

Universities in the UI GreenMetric rating system and the top 10 of Turkey's rankings were selected as research fields. Zonguldak Bülent Ecevit University, on the other hand, has been optionally added to the research fields as it is a valuable data source for the Turkish secretariat of UI GreenMetric. Selected research fields are presented in Table 1 below.

After the interviews with the relevant units of the universities and the research permits obtained; In-depth interviews were conducted with a total of sixteen (16) people, including consultants of the sustainability commission, sports facilities and recreation area officials, and students. The aim here is to reveal the ideas and opinions of different internal stakeholders of universities on the same concept. Interviews were held online via video call application (ZOOM) on predetermined days and times, taking into consideration the pandemic conditions.

Table 2. Details of Analysis Units, Participants and Interview Times

Code	Unit of Analysis	Type of Participant	Interview time
K1	Sustainability Consultant	Academic Staff	35:35
K2	Sports Facilities Manager	Academic Staff	21:53
K3	Personal Experience for Campus and Facilities	Student (Sports Sciences - Graduate)	27:12
K4	Sustainability Consultant	Academic Staff	1:13:12
K5	Sports Facilities Manager	Academic Staff	28:36
K6	Sustainability Consultant	Academic Staff	31:58
K7	Personal Experience for Campus and Facilities	Student (International Rel. 4th grade)	39:09
K8	Personal Experience for Campus and Facilities	Student (Industrial design 4th grade)	30:04
K9	Personal Experience for Campus and Facilities	Student (Sports Sci. - Master's Degree)	25:57
K10	Personal Experience for Campus and Facilities	Student (Civil Engineering - 4th grade)	52:23
K11	Sustainability Consultant	Academic Staff	45:45
K12	Personal Experience for Campus and Facilities	Student (Industrial Design - 4th grade)	36:24
K13	Personal Experience for Campus and Facilities	Student (Bio-technology - PhD)	22:10
K14	Sustainability Consultant	Administrative Officer	1:04:23
K15	Sustainability Consultant	Academic Staff	1:04:23
K16	Sports Facilities Manager	Sports Specialist	1:04:23
Total Interview time	8 hrs 03 min 27 sec		
Average Interview time:	30 min 21 sec		

In Table 2, the dates of the interviews and the details of the participants during the data collection period are given. Participants were coded as "K1, K2…" in order to ensure the confidentiality of their Personnel data. The numbers in the codes were assigned sequentially during the negotiations; continued to be determined by assigning the next number to the next participant. The interviews were realized out within the framework of the research plan, during the periods covering the dates of April 1, 2021 - October 30, 2021.

It was monitored that the feedback received during the interviews concentrated on similar points and the existence of a repetitive structure. The data collection phase was terminated with the completion of the scheduled interviews.

Data collection and analysis

Data diversification was applied to increase the reliability of the research and to provide verification by obtaining data based on individual experiences from different sources (Shenton, 2004). Two different types of variation were used to collect data, namely methodological variation and data source (participant) variation. Methodical diversification with one-on-one interviews, observations and document analysis; Data source (participant) diversity was also obtained by obtaining data from different participants (sustainability consultants, sports facilities and recreation areas authority and students). A semi-structured interview form was used in the interviews. The questions in the interview form were determined by considering the theoretical framework in the literature. It was soon changed into its final form, inspired by related research (Stinnett and Gibson, 2016a, 2016b; Xu, 2018). Following the participant's consent, the interviews were conducted using only audio recordings, with the participant's knowledge. After the interviews were completed, the researcher transcribed the audio recordings of all interviews.

Since the interview forms used in the data collection process of this research contain statements that are appropriate to the theoretical background of the research; the responses (data) received from the participants were automatically shaped under the already determined themes (a priori approach). In addition, all the data were read in detail under the thematic

analysis method of Braun and Clarke (2006), and attention was paid to the classification of the data.

Findings

The themes and sub-themes that emerged as a result of the interviews are shown in Figure 1. This structure, which was obtained as a result of the analyses, is the framework structure that includes the main titles and sub-titles that should be included in the sustainability assessments on campuses.

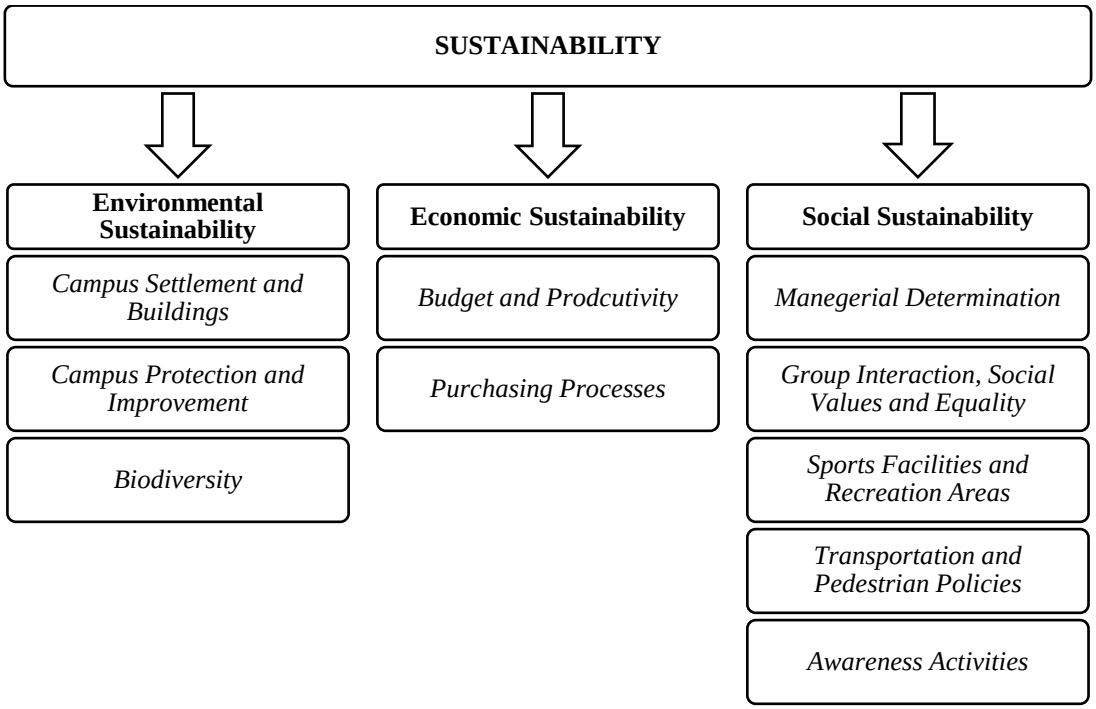

Figure 1. Themes and Sub-themes

In this section, instead of giving examples of views on all sub-themes, short and selected quotations are included to reveal the general impression.

Theme 1: Environmental Sustainability

Opinions about the good physical conditions of the campuses and the abundance of green areas are in the majority. Most of the students describe the campus environment as quality and regular:

> *"It is a campus with a lot of green spaces. They care a lot about the environment. Not throwing garbage on the ground, cleanliness, friendly communication with animals makes you feel like you are in a quality environment." (K13-S)*

> *"There are photocell faucets in toilets, for example. You can't spend too much even if you want to. Lighting sensors. The university took action. It restricts excessive consumption; the student does not need to make an extra effort." (K8-S)*

> *"Our academic buildings are LEED certified. As a university that produces its own electricity, we have a distinctive feature from the others. We also have some structures where we apply a gray water system. The water in the sinks is filtered and transferred to the siphons." (K14-ST)*

> *"It is a campus with a lot of green spaces. It's like you're in another country." (K12-S)*

Participant opinions regarding the reuse of waste at a university are as follows.

> *"No waste produced on our campus goes to waste. Each piece is transmitted to the contracted institutions and inspected through the sustainability department. We have ISO 14001 certificate. Therefore, both our campus and our processes are compatible with sustainability." (K14-ST)*

Biodiversity in sustainability is addressed from the perspective of wildlife conservation. However, in the question posed to the participants in this study, it was asked to reveal the diversity of living things in the campus and the interactions with them.

> *"Our campus is a cat lover, dog lover, squirrel lover, hedgehog lover. We have turtles. The local people have an understanding of nature and animal love brought by this geography." (K4-ST)*

> *"There is a student community. In matters such as taking care of animals, feeding. Even the teachers knew them all. I didn't see anything negative about the animals." (K13-S)*

> *"We have an animal shelter. We bring in veterinarians from outside and have regular health checks. The student club raises money and provides support for the food. We also have teachers from the administrative staff who are interested in volunteering." (K16-SPR)*

Theme 2: Economic Sustainability

In the interviews, it was seen that majority of universities had difficulties in terms of budget and had difficulty in regularly supporting their sustainability initiatives.

> *"We are trying to fix one side of the work with the projects piece by piece, as we find a grant as we find a budget, that's the gist of it!" (K4-ST)*

> *"Every year, we go out to two tenders for sports equipment and transportation. For balls, equipment, etc. to take teams to competitions. We ensure that these purchasing processes are as cost-effective as possible. Our budget is getting smaller and smaller." (K5-SPR)*

In some universities, it is stated that even if the budget to be used in sustainability studies is sufficient, their spending powers are limited in accordance with the legal regulation:

> *"For example, in UI GreenMetric, the budget allocated to environmental issues is asked. But for example, the possibilities of each country are different and the legislation is also different. For example, in our country, 'The Council Of Higher Education' or 'Presidential Strategy Department' imposes restrictions on such things. For this reason, some countries or universities cannot allocate a budget for these issues. For example, we have steps to take, but we are stuck with the legislation, our hands are tied." (K6-ST)*

On the other hand, in terms of efficiency, a consultant cost-benefit analysis was carried out, while in another university various needs were met by using its own internal services:

> *"The cost-benefit analysis is being done. All our units have sustainability boards. This has already been mandated by the quality assurance system." (K6-ST)*

> *"I do not have a direct role in these matters, but I know that cost-benefit analysis is done in all economic processes. An efficiency-oriented spending procedure is followed in every expenditure, including sports facilities. The university has a large budget, but a frugal economic policy is followed as if it were not. This is a process that must be followed for economic sustainability." (K11-ST)*

Theme 3: Social Sustainability

Some consultants state that sustainability studies in universities are required to comply with legal procedures and the decisions taken by the Council of Higher Education.

> *"GreenMetric is a free and easy system. Later, the Council of Higher Education took it into the 'Monitoring and Evaluation Criteria'. In fact, it has legal obligations on its basis, but it has contributed to raising awareness about the environment and sustainability." (K6-ST)*

On the other hand, in a university, sustainability was planned with the feasibility studies carried out during the establishment of the university.

"While the occupational health and safety conditions were created during the establishment phase, various feasibility studies were also carried out in order to have a sustainable campus. Our founding rector and subsequent administrators worked in line with this vision and enabled us to get to where we are today." (K15-ST)

Statements on the interaction of student groups on campus, meeting social needs, policies on the use of areas such as sports facilities, thoughts on animal protection, and social benefits.

"Communities are very active at this university… It's a very lively campus, there's a lot of community, there's constant activity. There are so many cultural events such as concerts and theater that they all come to you on campus." (K7-S)

"We have a big green space. Concerts and spring festivals are held. This is a common space that everyone uses and where students interact." (K10-S)

"I think college students are intellectuals. They follow the agenda. Issues such as gender equality are not an issue here." (K12-S)

"It is amazing that students can think and talk freely." (K13-S)

"We are trying to facilitate our students with disabilities and students from different cultures in terms of equal opportunities. Apart from this, our university has a gender equality unit. We organize events in which all our stakeholders participate and ensure that everyone participates. This is in the missions of the university."(K16-SPR)

There are mostly positive opinions about sports facilities such as the adequacy of the sports facilities on the campuses, their physical conditions, and the provision of services outside the campus.

"I think the number of gyms is very sufficient. For example, there are about ten tennis courts. There is a basketball court everywhere. Since the campus is very large, there are also many trails for walking and jogging. Apart from that, there are posters that encourage doing sports outside." (K7-S)

"One of the strengths of the campus is the sports facilities. Tennis courts, volleyball court, swimming pool, walking areas, etc. There are rich opportunities to do sports on campus. The schools own stadium is very good. A wide variety of activities are organized. The pool is good quality to hold international competitions." (K10-S)

"Before the pandemic, our sports facilities were also serving users outside the campus without exception. About 5 years ago, the hours of use of students and academic staff were separate. But at the moment, we don't think that there is a distinction between students and academics." (K5-SPR)

"There are indoor sports fields, swimming pool, tennis courts, and many sports opportunities within the campus. All of our sports facilities are open to both campus users and the public. There are no restrictions." (K11-ST)

"The areas reserved for recreation are quite adequate, well-maintained and clean. There are enough sports fields. Since it is a forested area, there are many people who do sports outdoors." (K12-S)

The transportation facilities of the universities in the research areas vary. For example, while some campuses have deficiencies in public transportation; it is seen that the shortcomings are tried to be eliminated with the possibilities of using bicycles. In some campuses, due to the geographical conditions of the campus, the difficulties experienced in bicycle and pedestrian transportation are tried to be solved by public transportation and ring service:

"There are no bike paths. Our roads are wide, but the campus has a very sloping structure. I've never seen anyone ride a bike at school until now. Ring services are made very often." (K12-S)

"We have a lot of bike parking spaces. Cycling is also very common on campus. There is also a bike path. There are also bicycle parking areas in front of the dormitories and gyms. It is being tried to encourage its use." (K5-SPR)

"The number of areas where we can park bicycles has been increased. There are also bike paths. Access to the campus is also easy, there are stops nearby that you can reach the community by transport." (K10-S)

Some participants linked the development of sustainability awareness with the vision and mission of the university.

> *"This campus has a system based on creating a culture of sustainability. So the student comes to campus; clean energy, sustainable building, good waste management, he sees and experiences these." (K14-ST)*

> *"Recruiters receive training on sustainability. Students also take courses in which sustainability is integrated from the preparatory stage. We are trying to develop that further." (K15-ST)*

Some consultants and sports facilities managers observe the changes in themselves and students' awareness.

> *"There was a study we did a long time ago. We asked the students, "What is a green university?" The answers are birds, trees, parks, waters. There is always a description of nature, they never knew its depth in terms of operation. However, today, awareness has been raised on many issues such as the correct direction of waste, keeping electricity and water consumption under control." (K4-ST)*

> *"I have been working here for about 10 years. Back then, if you had asked, -What is sustainability?- I would have said something like ongoing stuff, and I wouldn't have been able to answer almost any of the questions in this interview. There is an information and training study conducted by the sustainability coordinator at the start of the job. And there is such a spirit of sustainability in this campus that I see it at a level that will direct both myself and all students to volunteer work in terms of sustainability" (K16-SPR)*

Discussion and Conclusion

The green areas on the campuses are large, and the campuses are nested with nature, which is the common denominator that the participants of all status met in the interviews. This outcome could be attributed to the environmental sustainability center's advancement of sustainable campus initiatives and the priority given to environmental regulations. Although this may seem like a one-way benefit, Li, Ni, and Dewancker (2019) state that increasing green spaces on campuses will largely result in sustainable development and a long-term gain. Opinions were also given about how their campus made them feel good and happy. Kasser and Sheldon, (2002) stated that happy individuals are also inclined to environmentally friendly behaviors such as cycling and adapting to recycling practices. In addition, it has been observed that students on campus use open areas for group interaction and interact together on issues such as summer festivals, concerts and festivals. Alshuwaikhat and Abubakar (2008) determined that universities should emphasize the importance of issues such as; human dignity, equality, peace, justice, civil rights, security and health within the scope of social sustainability.

According to research, students on sustainable campuses have higher levels of life satisfaction and quality of life than those on non-university campuses (Tiyarattanachai and Hollman, 2016). In this regard, the campuses' strong environmental sustainability aspect in research areas allows students to have positive thoughts and express satisfactory discourses about their quality of life. Besides, there are researches where the biodiversity on campuses can make students find urban areas more attractive (Lindemann-Matthies and Brieger 2016) and the biodiversity on campus gives people a unique chance to connect with nature (Liu et al., 2021). In this direction, it is important to protect and develop the living creature-centered structure.

The respect for this living life on campuses can also be evaluated in terms of environmental ethics. From this point of view, it can be concluded that instead of a human-centred anthropocentric perspective, there is a living-centred ethical texture at a level close to holistic ethics. There are also studies in the literature that this biodiversity in university campuses enables students to find urban areas more attractive (Lindemann-Matthies and Brieger, 2016).

From this perspective, it can be stated that the animal-friendly environment in the research areas of our study and the satisfaction of the students support the literature.

In the interviews, it was found that university administrations have various difficulties in terms of budget and have difficulties in supporting their sustainability initiatives with a regular budget. Aleixo et al., (2018) examined the perspectives of a group of 20 participants selected from 4 different public universities in Portugal. As a result of the study; it has been determined that the biggest obstacle to sustainability in public universities in Portugal is the lack of financial resources. Therefore, higher education institutions have to ensure financial sustainability that will enable the university to achieve its goals by guaranteeing sufficient income to invest in future academic and research activities (Sazonov et al., 2015). The findings in this study also show parallelism with the results in the literature.

In terms of transportation; it can be said that the most common problem complained about in research fields is the inadequacy of the ring shuttle services in the campus. There are also participant opinions that the geographical conditions of the campuses create an obstacle for the use of bicycles. Dehghanmongabadi and Hoşkara (2018) state that there are several barriers in promoting sustainable transportation choices in universities. In the Green University report of the United Nations, it is stated that one of the features that should be in sustainable campuses is the establishment of a pedestrian-friendly structure where motor vehicles are reduced. In Allen and Farber's (2018) studies, an inverse relationship was found between the duration of students' access to school and their willingness to participate in activities on campus. In addition to all the aforementioned information, considering the fact that transportation to the campus is directly related to the time that the student will spend on campus, it is more clearly understood that university administrations should focus on transportation and pedestrian policy.

It has been observed that students are mostly aware of sustainability activities such as reducing electricity and water consumption, and collecting waste, and changes in their behaviors have occurred. It is stated that there are awareness-raising activities and lessons added to the curriculum in providing this awareness and behavior change. These results show that sustainability studies in the literature overlap with studies on raising awareness and changing positive behaviors (Zain et al., 2012; Cho, 2019). According to Dagiliūtė and Liobikienė (2015), curriculum design can provide students with basic information about the environment and sustainability, which may raise awareness. Based on this information, we can conclude that the findings of our study, which show a high level of sustainable awareness on campuses, overlap with the findings of previous studies.

Sustainability is an important issue in the operation of facilities, as sports and recreational facilities generally consume more water and energy than normal (Balcı and Koçak, 2014; Ünlü and Şahin, 2021), produce large amounts of waste and adversely affect the environment (Apanaviciene et al., 2015). There are studies in the literature that specify various criteria that sustainable sports facilities should have (Çetin and Karaçam, 2020; Yüce, Katırcı and Yüce, 2020; Atalay, 2021). As seen in the study's research areas, income-generating activities in sports facilities are insufficient, only energy-efficient devices are used in subjects such as electricity and water consumption, and it places a significant burden on university budgets in terms of economic sustainability. In the context of social sustainability, the place and importance of sports in sustainable development has been adopted by international institutions and organizations such as the International Olympic Committee (IOC, 2006) and the U.N. (United Nations, 2015a; United Nations, 2017). In this respect, this function of sports should be handled and used carefully by university administrations. Especially, McKenzie's (2004)

emphasis on "recreation" under the heading of access to basic services once again reveals the role and importance of sports in the sustainability of campuses.

This research is the first to be conducted in a multiple case study design, focusing on sustainable university campuses in Turkey. It is thought that the results of this study can provide new perspectives for other studies in the literature.

Implications

1. Regarding the sustainability activities of universities:

It has been specified that the sustainability studies in the universities examined in this research are conducted in the context of the first periods of sustainable transformation and are primarily focused on the physical structure of the campuses as well as subjects such as energy, water, and waste in the context of ensuring ecological peace. Foundation universities, it has been observed, have a more comprehensive understanding of sustainability than state universities. However, the driving force of this transformation seems to be compliance with legal obligations on zero waste. However, when international successful examples are examined, it is stated that a holistic approach should be adopted, encompassing all campus stakeholders, regardless of environmental, economic, or social aspects. Instead of providing a sustainable transformation focused on university rating systems, it can be stated that it is necessary to plan and implement a transformation process suitable for its own conditions, while keeping the basic principles of sustainability in thought.

2. For sports facilities and recreation areas:

Some functions of sports facilities in universities, such as lighting and water systems, have been updated. While trying to achieve efficiency in terms of consumption with these changes, the ageing structures of the buildings create a handicap in terms of heating. However, due to the increasing number of student quotas, it is understood that the sports facilities, which were at a sufficient level in the past, have been insufficient in providing services in recent years. It is understood that the open spaces and recreation areas on the campuses are used effectively by the students. In light of this information, recreational areas used by the campus residents as a means of socialization should be enriching. Also, it can be stated that buildings should be designed and operated in a way that will provide environmental, economic and social benefits under the modern sustainability model. Once international examples are examined, the policy of providing a healthy and quality life in terms of social sustainability is given importance in university campuses, which are at the top of various rating systems, and encouraging policies in the use of sports facilities and recreation areas.

Recommendations

The scope of this study's participant group was determined within the scope of universities within the UI GreenMetric system, and some of the findings were discussed within the context of the UI GreenMetric system. In future studies, taking into account university rating indexes (STARS, THE Impact Ranking, etc.) that deal with sustainability in a holistic dimension may provide a broader perspective on sustainable university models.

[*] *This study is summarized from doctoral dissertation, titled 'Üniversitelerin Sürdürülebilirlik Yolculuğu Kampüslerin ve Spor Alanlarının Yönetici ve Öğrenci Perspektifinden Değerlendirilmesi' conducted at Anadolu University, Graduate School of Social Sciences.*

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