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ISTANBUL OKAN UNIVERSITY

INSTITUTE OF GRADUATE SCIENCES

MASTER THESIS GRADUATION PROJECT THE DEPARTMENT OF ARCHITECTURE

MASTER'S DEGREE PROGRAM

DUNAMA SA'ADAT MADAKI

THE IMPACT OF THE PHYSICAL ENVIRONMENT OF A CAMPUS DESIGN REFERING TO SOCIAL SUSTAINABILITY IN UNIVERSITY CAMPUSES: ISTANBUL OKAN UNIVERSITY CASE

THESIS ADVISOR

Asst. Prof. Dr. Eda Özsoy

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ABSTRACT

University campus built environments directly affect students' social connections while influencing their cultural participation and overall well-being. This research investigates how spatial design affects social sustainability in University campuses through an examination of Istanbul Okan University's Tuzla Campus as the case study. It combines architectural analysis with student surveys to evaluate essential physical criteria (accessibility, safety, comfort, spatial organization, environmental quality, and aesthetics) and social/cultural criteria (inclusivity, sense of belonging, diversity representation, cultural symbolism, and opportunities for interaction) that determine campus experiences.

The research shows that intentional spatial arrangements create stronger place attachment among students while fostering inclusive environments that support diverse cultural activities. The research shows that campuses built with these criteria develop stronger community bonds while improving quality of life and sustaining long-term development. The research also provides new insights about how built environments can be used to develop educational spaces that promote social and cultural enrichment and provides recommendations that will help future campus planning and design create spaces that support academic achievement and complete student development.

Keywords: university campus design, built environment, social sustainability, cultural sustainability, quality of life, architectural criteria, Istanbul Okan University

ÖZET

Bu araştırma, üniversite kampüslerinde fiziksel mekân tasarımının öğrencilerin sosyal ve kültürel sürdürülebilirliğine olan etkisini incelemektedir. Çalışmanın ana odağı, İstanbul Okan Üniversitesi Tuzla Kampüsü'dür. Araştırma, kampüsün yapılı çevresinin öğrenciler arası sosyal etkileşimleri, kültürel alışverişi ve genel yaşam kalitesini nasıl etkilediğini değerlendirmektedir. Nitel araştırma yöntemleri, kullanıcı anketleri ve mimari analizlerin bir araya getirilmesiyle, sosyal ve kültürel sürdürülebilirliğin artırılmasına yönelik somut öneriler geliştirilmiştir.

Çalışma kapsamında, kampüs planlamasında yer alması gereken başlıca fiziksel ve sosyal/kültürel tasarım kriterleri belirlenmiştir. Fiziksel kriterler arasında erişilebilirlik, işlevsellik, doğayla entegrasyon, güvenlik, esneklik ve teknolojik altyapı gibi unsurlar yer alırken; sosyal/kültürel kriterler olarak etkileşim alanlarının yeterliliği, kültürel temsil, aidiyet duygusu, çok kültürlülük ve sosyal güvenlik ön plana çıkmaktadır. Bulgular, mimari tasarımın sadece estetik değil, aynı zamanda öğrencilerin sosyal yaşamları ve kültürel etkileşimleri üzerinde derin etkileri olduğunu ortaya koymaktadır.

Bu çalışma, eğitim kampüslerinin sürdürülebilirliğini artırmak amacıyla kapsayıcı, erişilebilir ve kültürel açıdan zengin fiziksel ortamların önemini vurgulamaktadır. Mimarlık, topluluk ve kalıcı etki arasındaki etkileşimi bütüncül bir şekilde ele alarak, daha yaşanabilir ve öğrencileri güçlendiren kampüs ortamlarının oluşturulmasına katkı sağlamayı amaçlamaktadır.

Anahtar Kelimeler: üniversite kampüsleri, sosyal sürdürülebilirlik, kültürel sürdürülebilirlik, yaşam kalitesi, kampüs tasarımı.

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CHAPTER 1. INTRODUCTION

1.1 Background Of Study

The built environment acts as a significant factor that influences human conduct, social relationships, and overall quality of life (Dovey, 2010). Every building space, including homes, offices, hospitals, and schools, requires deliberate planning during construction and ongoing maintenance to adapt to changing societal requirements. University campuses function beyond physical structures because they create cultural and social environments where students experience education and personal development. Students interact with each other and form communities while developing personal identity through the architectural design elements and spatial arrangements that shape their educational spaces.

A well-designed campus creates more than basic functionality because it actively fosters a dynamic academic environment combined with social vibrancy. Spaces that include flexible learning environments and inclusive gathering areas, together with pedestrian-friendly pathways and culturally distinctive architecture, enable students to interact meaningfully and understand different cultures. The campus environment transforms into a space where students develop socially and maintain cultural values. Effective campus design needs to unite physical facilities with social components because it must serve diverse student requirements and promote inclusivity, and improve student well-being.

Educational institutions' built environment serves functions beyond visual appeal and physical construction because it actively influences student life. The strategic placement of lecture halls and dormitories, together with recreational areas and green spaces, directly affects student behaviors and their social patterns and cultural interactions. According to Winston Churchill (1943), "We shape our buildings; thereafter they shape us" (Winston Churchill, 1943). The built environment has a deep and enduring impact on the people who occupy these spaces, according to this understanding.

The research investigates how architectural design affects students' social development and cultural sustainability by studying Istanbul Okan University's Tuzla Campus. The research assesses the impact of spatial design on student interaction and social inclusivity, and cultural expression at the campus through architectural evaluation and literature research, and student questionnaire data. The research aims to discover vital design elements that create sustainable educational environments that support both social and cultural sustainability.

By critically examining Okan University's campus layout, spatial quality, and cultural representation, this study contributes to a deeper understanding of how educational spaces can support a diverse student population. The research findings present architects with essential knowledge and educators and policymakers with important guidelines to develop educational environments that serve their functional needs while fostering social growth and cultural inclusivity. The research advocates for educational campuses to focus on human experiences and social connection development alongside cultural preservation in their communities.

Significance Of The Study

This research on the effect of the built environment on students' social and cultural sustainability in educational campuses is of great importance to academia, designers, and policymakers. It provides useful information on how spaces can be designed to support learning that is inclusive, interactive, and culturally sensitive, and has several implications and significance:

1. **Improving Campus Planning and Design:**
   The study provides an opportunity to examine how spatial design influences student behavior, social interaction, and cultural engagement. By identifying key design elements that promote social and cultural well-being, the research can provide guidelines that can be used by architects, planners, and university administrators in designing vibrant, inclusive, and sustainable campus environments.
2. **Enhancing Student Well-being through Human-Centered Design:**
   The knowledge of how the built environment affects social ties and cultural identity can help in creating campus environments that are conducive to students' academic success, mental health, and psychological growth. This research underscores the need for spaces that are oriented towards the well-being, inclusivity, and interaction of individuals.
3. **Empowering Diversity and Cultural Inclusivity:**
   University campuses are inherently multicultural, with students from diverse backgrounds converging in shared spaces. This study examines how design can facilitate intercultural dialogue and create communities that recognize, respect, and engage students.
4. **Addition to Interdisciplinary Knowledge:**
   This research adds to the increasing body of literature in the area of architecture, social sustainability, and education. By looking at the intricate relationship between physical space, social processes, and cultural manifestations, the study contributes to the

development of educational environments that are sustainable in a holistic manner—socially, culturally, and emotionally.

5. **Informing Policy and Design Interventions:**
   Data-driven strategies and design policies will be developed by using the findings to put students' lived experiences at the centre. These findings can be used to guide the design of campus spaces and the planning of buildings in ways that will support community engagement and ensure long-term sustainability as well as inclusivity.

This study has the potential to influence the future of university campuses by understanding how physical environments can be used to promote student participation, cultural differences, and overall well-being. It can be used as a model for other universities that want to create socially sustainable and culturally vibrant campus ecosystems.

Problem statement

Educational campus architecture strongly determines the social and cultural development of students during their educational journey. The actual design of educational campuses frequently does not match the regular social and cultural requirements of their student population. Many educational institutions lack proper spatial arrangements that promote social contact and cross-cultural interaction, and community building, which form essential elements for social and cultural sustainability in educational environments (L. Volker, 2011).

The growing urbanization and expanding educational institutions require a better understanding of how architectural design and spatial organization, and campus planning affect student engagement and well-being. Bovill (2015) explains that sustainable construction involves more than physical infrastructure because it needs to advance social and cultural sustainability through enhanced life quality for people and communities.

Istanbul Okan University serves as an appropriate research site because its spatial layout, campus culture, and student diversity enable a thorough analysis of built space-student experience connections. The insufficient presence of communal spaces alongside culturally inclusive design features and socially responsive infrastructure acts as a barrier to meaningful socialization while restricting cultural expression and decreasing student environmental attachment.

This research investigates how the built environment at Istanbul Okan University affects students' social and cultural sustainability to what degree. The study aims to uncover how

physical and architectural choices promote campus inclusion while achieving cultural integration and a strong student sense of belonging.

The following research questions would be addressed in this thesis:

1. How do specific elements of the built environment, such as spatial layout, circulation, green spaces, and shared facilities, impact students' social interaction and sense of community on campus?
2. What design strategies within university campuses promote cultural inclusivity, cross-cultural interaction, and student engagement?
3. How do students perceive the role of campus design in shaping their social life, comfort, and cultural expression at Istanbul Okan University?
4. To what extent do current design features on the Okan University campus support social and cultural sustainability?
5. What recommendations can be made to improve campus design and planning to enhance students' overall social and cultural well-being?

This research also addresses the following topics:

- The types of areas students use most often and feel comfortable in (e.g., lecture rooms, lounges, leisure areas).
- How architectural layout affects students' moods, relaxation, and casual socialising.
- Efficient places to encourage spontaneous interactions between students and create social bonding.
- To what extent do the architectural structures affect the contacts between students of different cultures?
- Practical architectural strategies that could enhance social inclusion and foster cultural sustainability in educational institutions.

1.2 Research Objectives

The main objective of this research is to explore the impact of the built environment on educational campuses on students' socialisation, cultural involvement and happiness. The study employs Istanbul Okan University as an example to close the gap between theoretical design principles and real campus design through an assessment of spatial arrangement, environmental quality and design principles in developing sustainable university communities.

This research argues that campuses must be planned and designed with people in mind to create a sense of community, foster cultural exchange, and foster the development of inclusive, engaging and dynamic learning spaces. It also examines the ways in which innovative design principles can be used effectively and sustainably to enhance the student experience and the sustainability of the campus in the long term.

The specific objectives of this research are:

1. To identify the key components of the built environment that influence students' social interactions and sense of belonging on university campuses.
2. To examine how campus design principles contribute to the promotion of cultural diversity, inclusivity, and intercultural engagement among students.
3. To explore students' perceptions and lived experiences of the campus environment and its impact on their social and cultural well-being.
4. To evaluate the effectiveness of current campus planning and design strategies in fostering social cohesion and cultural sustainability.
5. To provide design and planning recommendations for improving university campuses to better support student engagement, cultural understanding, and social sustainability.

By focusing on these research objectives, the study hopes to assist in designing and planning University campuses that are not only effective and attractive but also socially inclusive and culturally sensitive to enhance students' satisfaction and institutional effectiveness.

1.3 Research Hypotheses

This research is aimed at assessing the effects of the built environment on students' social sustainability in universities with particular reference to Istanbul Okan University. The study looks at how design, space and layout, and communal areas affect students in terms of their interactions, attachment, and contact with other cultures. The following research hypotheses were formulated to guide the research process:

Hypothesis 1

- **Null Hypothesis (H_0):** The design components of the built environment are not related to students' social activities on educational institutions.
- **Alternative Hypothesis (H_1):** The built environment design factors are important in determining students' social activities on educational institutions.

Hypothesis 2

- **Null Hypothesis (H_0):** The design of educational campuses does not affect the diversity, inclusivity and intercultural interaction among students.
- **Alternative Hypothesis (H_1):** The design of educational campuses has a positive effect on the diversity, inclusivity and intercultural interaction among students.

Hypothesis 3

- **Null Hypothesis (H_0):** The perceptions of students regarding the campus environment are not significantly correlated with their social and cultural wellness.
- **Alternative Hypothesis (H_1):** The perceptions of the campus environment are significantly correlated with the social and cultural well-being of the students.

Hypothesis 4

- **Null Hypothesis (H_0):** The current campus design approaches are not effective in encouraging students to interact socially and sustain cultures.
- **Alternative Hypothesis (H_1):** The current campus design strategies effectively encourage social interaction and cultural sustainability among students.

Methodological Approach to Testing the Hypotheses

To assess the foregoing hypotheses, a mixed-methods approach, which included both quantitative and qualitative research tools, was employed. An online questionnaire was designed and administered to the students of Istanbul Okan University. The survey was designed to capture both closed-ended questions (for the quantitative analysis) and open-ended questions (to provide qualitative data). The questions were developed to gauge the students' views on the physical environment, social interaction, comfort, accessibility, and cultural sensitivity on the campus. (See Appendix A for survey questions.)

Limitations: The mixed-methods design improved the quality of the data; however, there were some limitations, such as the possibility of bias in convenience sampling and the exclusion of individuals without access to the internet. However, the use of face-to-face interviews helped to overcome some of the limitations.

1.4 Research Methodology

The evaluation of actionable ideas combines architectural analysis with qualitative research and user survey data. The main objective of this research is to integrate these elements to

enhance learning environments' social and cultural sustainability. The research approach for achieving results includes:

User Surveys: A thorough survey of Istanbul Okan University students will be performed to collect data about their built environment experiences and preferences, and perceptions, which will be analyzed for social interaction and cultural engagement, and overall satisfaction aspects. Participants were volunteers, and all respondents were guaranteed that their responses would be anonymous and confidential. Informed consent was obtained, and ethical standards were adhered to at all stages of the research.

Architectural Study: An in-depth analysis of the physical environment at Istanbul Okan University will be performed, and architectural features that impact social dynamics, cultural expression, and sustainability will be considered. Relevant scholarly literature on architectural design and social sustainability, which was reviewed in Chapter 2 above, would also be taken into consideration. Theories, case studies of existing sustainable educational campuses, and their best practices are also explored.

This mixed-methods approach aims to explore the complex relationship between the built environment, social interactions, and cultural sustainability within Istanbul Okan University and direct future design decisions that improve user experiences for architects, urban planners, and educational institutions. The findings will inform practical recommendations for enhancing student experiences and promoting a vibrant campus community.

Case Study Selection: The Tuzla Campus of Okan University was selected as the case study because it contains various architectural elements and provides an appropriate environment to study how occupants experience and prefer their surroundings. The campus environment provides a dynamic space that enables a thorough examination of how users interact with their built surroundings.

1.5 Scope And Limitation

This research examines how the physical environment of universities affects student social and cultural sustainability through their learning environment, physical organization, and building design. The study has chosen Istanbul Okan University as its case study to understand how the environment of a university impacts students' social and cultural well-being.

While the study aims to offer practical and theoretical insights, it is also subject to several limitations:

1. **Contextual Specificity:** The data in this study come from one case, Okan University, and its results are shaped by its unique cultural, geographical, and institutional characteristics. It is important to keep in mind that the results may not be valid for other universities or regions that have different social structures or architectural styles.
2. **Temporal Constraints:** The study provides data about student experiences and spatial conditions within a particular time. However, campuses are constantly changing, and the changing demographics of students, institutional policies, and physical facilities can affect long-term sustainability. This study provides insights into how social and cultural sustainability evolves in the long run. It is important to conduct longitudinal studies to understand this process.
3. **Narrowed Focus on the Built Environment:** Although the built environment is a significant factor in shaping student experiences, it is not the only factor that has an effect. The demographic composition of the students, curriculum design, administrative policies, and extra-curricular programs are also important in shaping the campus culture and sustainability. This study only explores physical and spatial aspects, and external factors such as these are not fully explored.
4. **Scope of Campus Features Analyzed:** The research is focused on the overall plan of the university, movement, public areas, and the outdoors, excluding the detailed design of interiors and the specific functions like classrooms and dormitories. These areas, although important, are not within the main focus of this research.

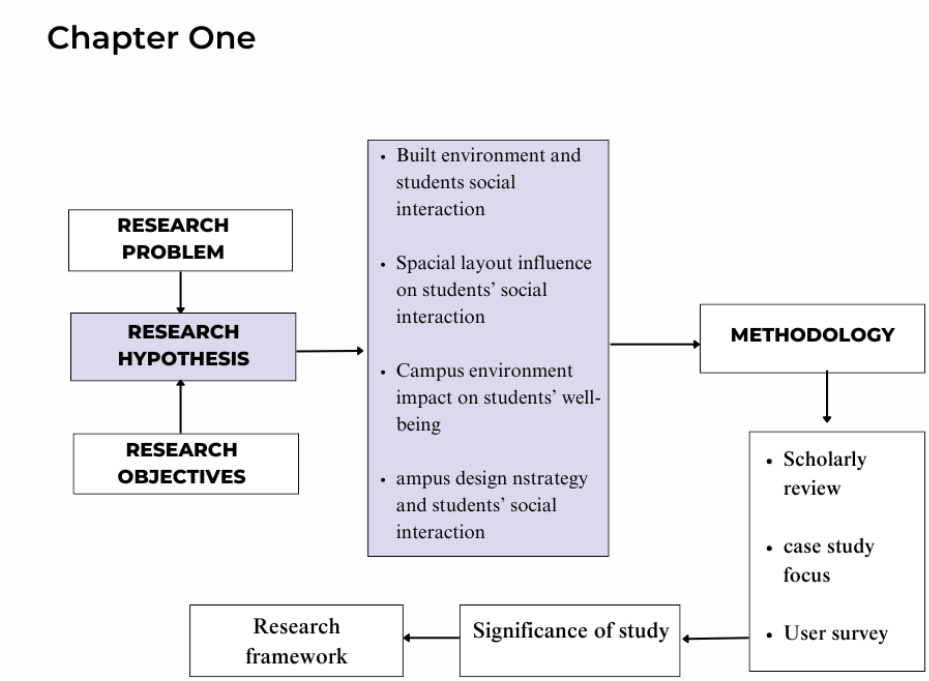

Figure 1.1 Chapter One Flow Chart (Prepared by researcher)

Research structure:

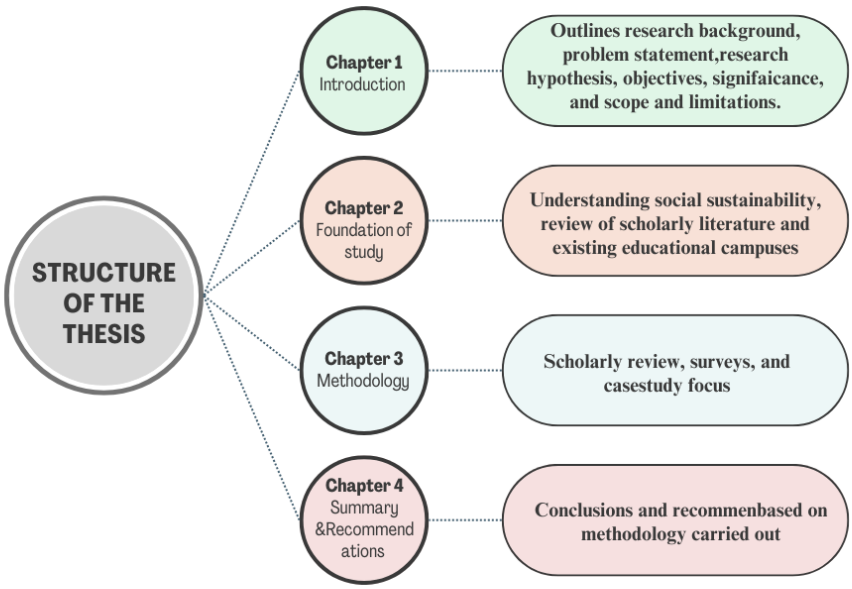

Figure 1.2 Structure of the thesis (Prepared by the researcher)

The first chapter of the research introduces background information and presents the problem statement and research hypotheses and objectives and significance and scope, and limitations. The introduction explains why the built environment matters for student social and cultural sustainability in university campuses.

The second chapter establishes the theoretical framework of the study by defining essential concepts such as social sustainability and quality of life and environmental quality criteria in educational contexts. The research incorporates a thorough evaluation of both worldwide and regional university campuses to demonstrate how spatial design elements support student welfare and social inclusion, and community development.

The research methodology section of Chapter Three explains data collection methods through surveys and interviews. The chapter introduces Istanbul Okan University as the main research site and delivers an extensive description of its built environment. The analysis section of this chapter presents students' evaluations of their campus environment based on collected data. The research includes a comparative study of selected universities to establish the context for the obtained results. The analysis examines social interaction and cultural diversity alongside sustainability through architectural and spatial design elements.

The study's main findings appear in Chapter Four, which demonstrates how built environments support student social and cultural sustainability. The research provides operational advice to campus planners and architects and educational institutions to improve their campus designs. The chapter explores sustainable educational environments beyond this study while identifying research directions for future investigation.

CHAPTER 2. EXPLORING THE BUILT ENVIRONMENT'S ROLE IN PROMOTING SOCIAL SUSTAINABILITY IN UNIVERSITY CAMPUS DESIGN

This chapter critically examines the built environment's contribution to social sustainability in university campus design. The discussion starts by clarifying theoretical social sustainability principles and their importance in higher education environments while showing how well-designed campuses affect student life quality and well-being and sense of community. The chapter develops a systematic evaluation system for university environments through its detailed analysis of social sustainability criteria. The following section examines the university context by discussing student satisfaction and essential architectural principles that guide campus planning. The chapter presents a comparative evaluation of selected universities across local and international contexts to analyze their physical and social environments that support sustainability. A complete comparison matrix serves as a tool to analyze these findings while providing recommendations for Istanbul Okan University.

2.1 Understanding Social Sustainability

Different scholars understand social sustainability in unique ways because they hold both similar and distinct perspectives about this concept. Social sustainability works to enhance life quality while promoting social equality and developing community bonds in urban environments. Social sustainability exists to support people and their social connections by building environments that enhance well-being and promote inclusivity and social unity. Social sustainability achieves its goal by uniting environmental and economic elements with social factors to develop solutions that fulfill human requirements while building resilience against future challenges thus connecting these three fundamental areas.

The diagram below illustrates major scholarly views about social sustainability through a combination of commonalities and unique perspectives. Different researchers have defined and implemented the concept in architectural studies as shown in this illustration.

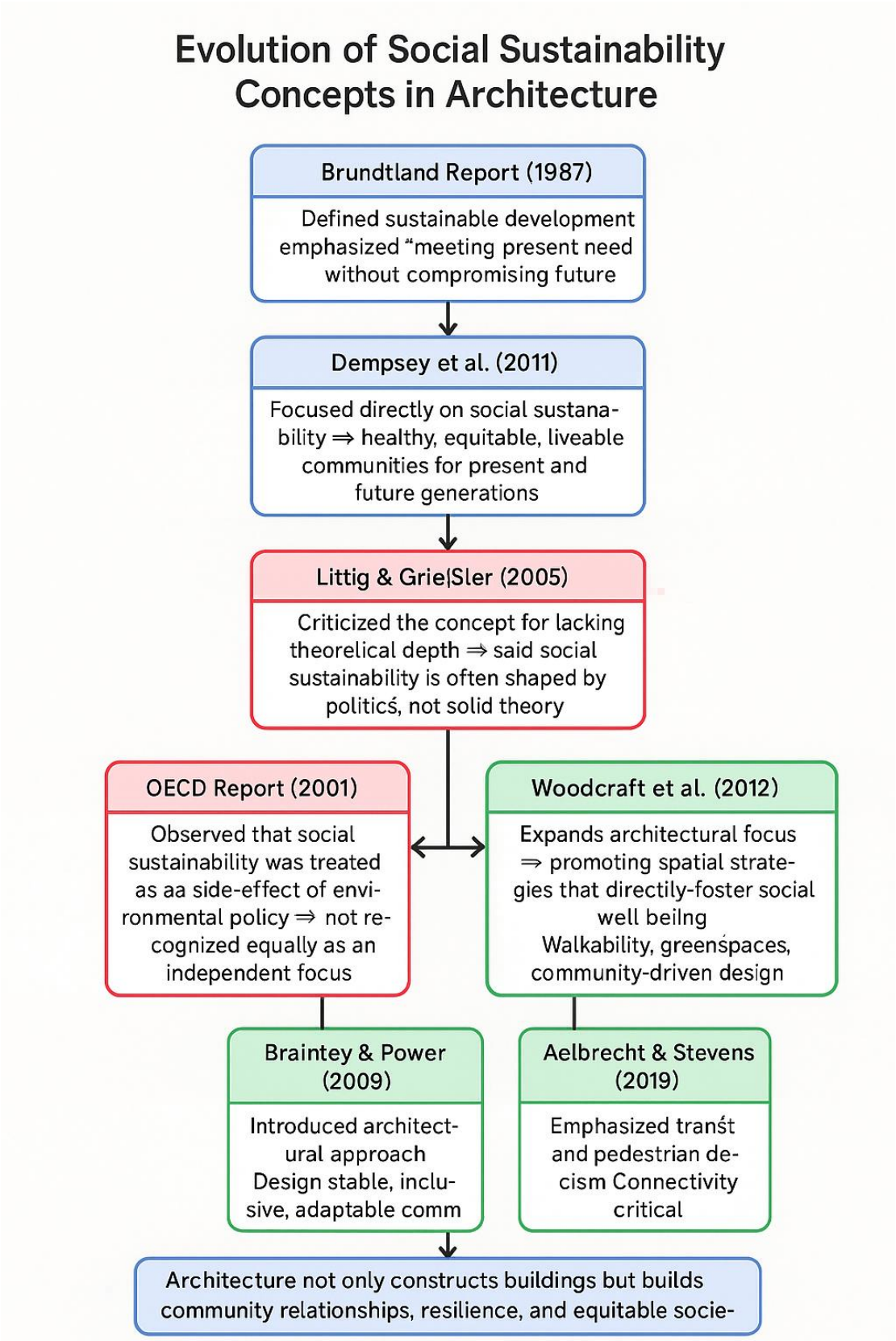

Figure 2.1 Evolution of social sustainability concept in Architecture: ***Scholarly review***

Dempsey et al. (2011), social sustainability is defined as one of the pillars of sustainable development that aims to create healthy, equitable, and livable communities for the present and the future. The view of Dempsey et al. (2011) is in sync with that of the Brundtland Report (1987) which stated that the modern understanding of sustainable development, defines social sustainability as the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development [WCED], 1987).

In both the perspective of Dempsey et al., (2011), and the Brundtland Report of 1987 the need for future generations is a constant. While the Brundtland report's main focus is on the balance between the environment and economics, it also indirectly embraces the social aspects by stressing on equity and sustainability of society. These principles resonate with the architectural practices that focus on people-centred design, community involvement, and spaces that are flexible to the changes in the social structure.

Social sustainability also includes aspects such as safety, accessibility, and participation to ensure that communities are sustainable and can support both the current and the future generations. Littig and Grießler argue that the theoretical foundations of the social sustainability concept are absent, and instead, the concept is based on pragmatic considerations of plausibility and existing political objectives (Littig & Grießler, 2005). Besides, A study done by OECD in 2001 shows that social sustainability is currently being treated in connection with the social consequences of environmental policy-making, rather than being considered as a fully equal component of sustainable development (OECD, 2001). Since each researcher, author, or policymaker formulates their definition of social sustainability based on their discipline-specific standards or research viewpoints, it is difficult to get a general definition.

In the following discussion, architectural scholars give a detailed explanation of social sustainability with particular reference to architecture. Architecturally, social sustainability is about creating environments that support the stability and flexibility of communities and foster a sense of community and participation (Chiu, 2003). This entails a strategy that includes public areas, mixed-use developments, and flexible infrastructure that can be adjusted to meet the needs of society. Likewise, according to Dempsey et al. (2011), social sustainability in architecture refers to the design and development of built environments that enhance social justice, community well-being, and sustainable societal capacity. It entails designing areas that

are in support of human relations and cultural preservation, and also promote inclusion, accessibility, social capital, and quality of life.

Moreover, Woodcraft et al. (2012) support that through the integration of features such as walkability, green spaces, and community-driven design processes, socially sustainable architecture promotes fair access to resources, social interaction, and well-being. Social sustainability underscores the importance of the built environment in the social structure, fairness, and community involvement. It entails the design of environments that enhance social interaction, social cohesion, and inclusivity as well as meet the needs of various groups of people. According to research by Bramley & Power, for places to be socially viable, open spaces and density must be balanced, ensuring that both the public and private spheres strengthen the social fabric (Bramley & Power, 2009). Moreover, accessibility is an important factor; Aelbrecht & Stevens highlight how transit networks and pedestrian-friendly designs foster social relationships (Aelbrecht & Stevens, 2019).

The design of spaces determines how people interact with one another and their environment, and it is a strong tool for improving social well-being. By designing spaces that are inclusive and accessible, architects can assist in the realization that all members of society, no matter their background or circumstances, have equal chances to participate in and gain from community life, thereby promoting a fair and a more thriving societal growth. Therefore, social sustainability in architecture is not only about designing structures but also about building relationships, equity, and well-being in the societies that use them.

2.1.1 Social Sustainability in University Campuses

University campuses function as active spaces that host diverse student social activities while supporting academic pursuits that influence learning experiences. The design elements of educational campuses require examination to develop learning spaces that support student well-being alongside community engagement.

The flowchart demonstrates fundamental concepts along with their relationships that lead to social sustainability implementation in university campuses. Architectural planning serves as the first element that affects social interaction, together with cultural exchange and sense of belonging, to create foundational support for student well-being.

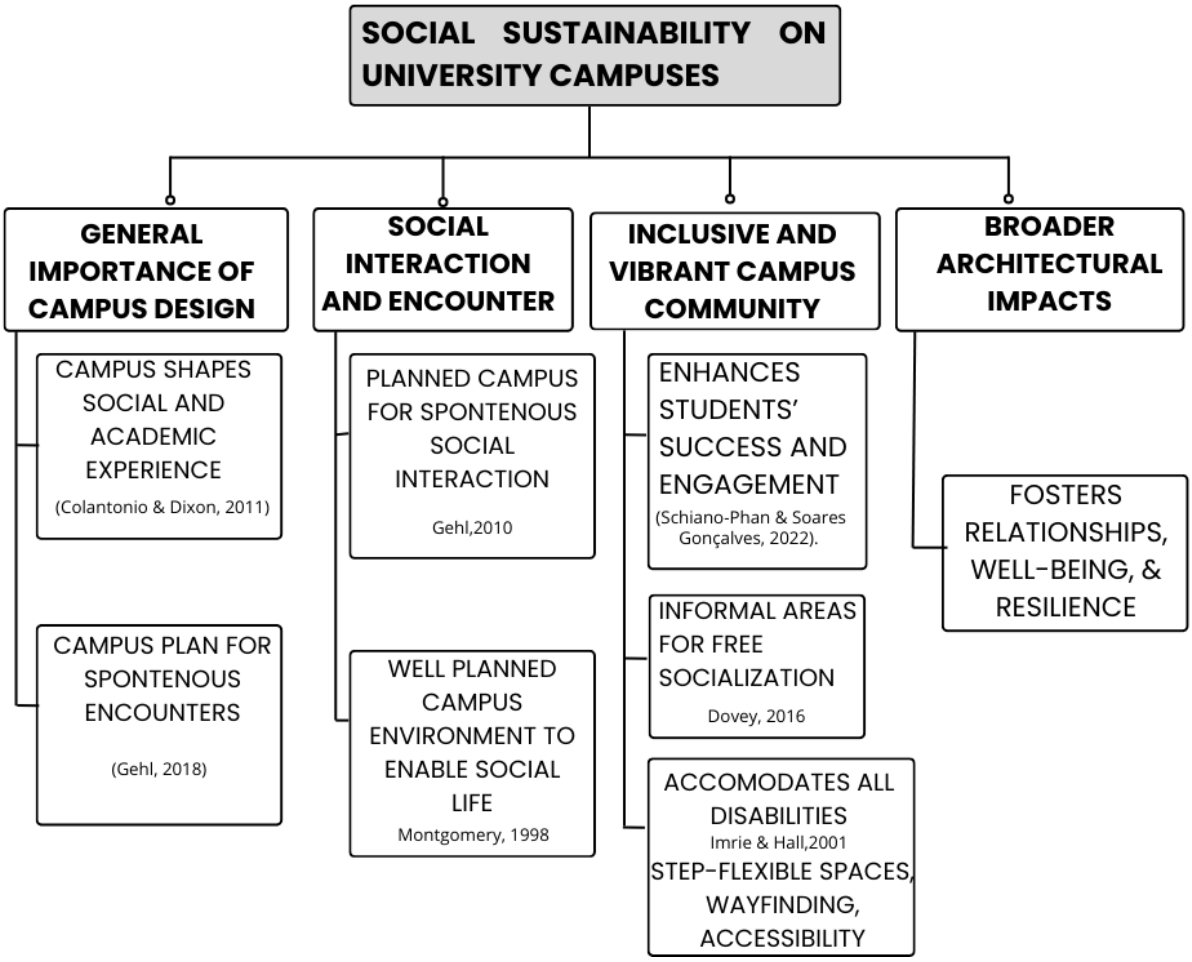

Figure 2.2 Architectural Strategies for Enhancing Social Sustainability in University Campuses: ***Scholarly Review***

The chart shows the strategies that promote social sustainability, which include: Dovey's emphasis on communal spaces, Imrie & Hall's universal design principles for accessibility, Gehl and Montgomery's planned and spontaneous interactions, and practical applications in universities such as Aalto University and Nottingham Trent University.

These strategies enable the creation of inclusive, supportive learning environments that promote equity and collaboration, and engagement among students of different backgrounds. The chart also shows that applying these socially sustainable design practices leads to long-term social resilience, student success, and a thriving learning community.

Social sustainability in architectural planning involves designinColantonio & Dixon, 2011)g environments that promote student socialization, cultural interaction, and belonging (. Gehl (2010) argues that the creation of planned and spontaneous social interactions is crucial for

building social connections among different groups of people. The design of a well-planned university campus offers more than just educational space; it also promotes students' social and psychological well-being through the incorporation of inclusive and dynamic spaces.

Social Sustainability in university campuses is a crucial element in campus planning and design and entails the creation of spaces that promote students' health, social harmony, and sense of belonging. It focuses on the development of spaces that promote interaction, collaboration, and inclusivity among the student body. By including social sustainability principles in campus design, institutions can develop dynamic, supportive, and inclusive learning communities that improve student success, well-being, and social involvement (Schiano-Phan & Soares Gonçalves, 2022). Montgomery states that well-planned urban areas can promote a healthy social life through the creation of opportunities for informal interaction and community participation (Montgomery, 1998). This approach to planning a university campus helps staff and students improve communication between different zones to facilitate both formal and casual interaction.

Another two critical components of social sustainability in university campuses are the availability of well-structured communal spaces and the accessibility of students. Dovey (2016) points out the significance of 'third places', areas outside the classrooms and dormitories that allow students to meet freely. Aalto University, Finland, applies this idea in its open and flexible design of spaces to encourage spontaneous meetings and academic interactions. According to Imrie and Hall (2001), a campus designed with universal design principles can include people with different physical and cognitive abilities and support equity and inclusion. All students, regardless of disability, will be able to participate fully in campus life because of features such as ramps, clear signage, and accessible technology in lecture rooms. The university that has used several accessibility-focused design methods is Nottingham Trent University (NTU), which ensures that students with different needs can move around and make use of the facilities in the campus.

Also, through the use of universal design principles, equity is enhanced, and all students, including those with disabilities, can fully participate in campus life. The physical layout of a University campus has a direct impact on social sustainability because it affects how students relate to each other, the level of inclusivity, and their overall well-being. Campuses that place

a high emphasis on accessibility, walkability, and green spaces foster environments that foster interpersonal engagement and self-development. A key factor that should be considered in the management of students of different backgrounds and the sustainability of colleges is the incorporation of socially sustainable design principles in campus architecture.

Jayaveer, T. (2021)- The thesis titled "Social Interaction and the Built Environment: A case study of university students in Waterloo, Ontario" thoroughly investigates the significant impact of campus design on students' social interactions. A primary finding of this study is the importance of incorporating communal spaces into campus design. The research further highlights the positive correlation between social engagement and students' well-being and mental health

It also highlights the importance of this diversity in promoting social interaction, cultural exchange, and students' cultural awareness.

Akman, S. (2016)- The thesis titled "Conserving and Managing Modern Campus Heritage: "ALLEY" as the Spine of the Metu Campus, Ankara" focuses on the Middle East Technical University (METU) Campus in Ankara, Turkey. The researcher examines the significance of the campus as a cultural heritage site, emphasizing the importance of integrating cultural and social values into its conservation and management.

The fundamental ideas in the thesis are:

- The need to preserve the social and cultural events that add to the campus's distinct identity
- To maintain the campus as a live, active community
- The adaptive reuse of buildings, arguing that it is possible to meet contemporary demands by repurposing existing structures while maintaining historical and cultural significance.

The study's main findings show that effective conservation calls for a multifaceted strategy that takes social, cultural, and architectural factors into account. The thesis concluded by stating that a comprehensive strategy that combines architectural preservation with social and cultural sustainability can effectively conserve modern campus heritage.

Shiney, R., Rajan, A., Al Nuaimi, R., & Furlan. (2016)- A research article titled “Qatar University Campus: Built Form, Culture, and Livability” with the goal of determining how much campus public space can be improved to raise students' levels of social engagement.

The researchers evaluated student activities using surveys, interviews, and visual materials to understand and assess their system and range, and believe that built environments reflect behavior and should be evaluated for the activities they support.

The analysis recommends that public open space on campus should include ample seating to foster social activities, enhance liveability, and maintain cultural identity, along with a mobile kiosk for refreshments. It concludes that actively involving students in campus design is important, as their input should shape guiding principles and recommendations for future development.

2.1.2 Criteria for Social Sustainability

Social sustainability is made up of various related concepts and values that are used to build healthy, inclusive, and sustainable communities. In the field of architecture, social sustainability is several standards that ensure that the built environment is inclusive, healthy, and sustainable. Factors such as equality, equity, diversity, social cohesion, life satisfaction, and democracy are some of the criteria that are used to determine the environments that are conducive to the growth of individuals and communities.

Based on the scholarly reviews below, the table below outlines the following criteria that define social sustainability.

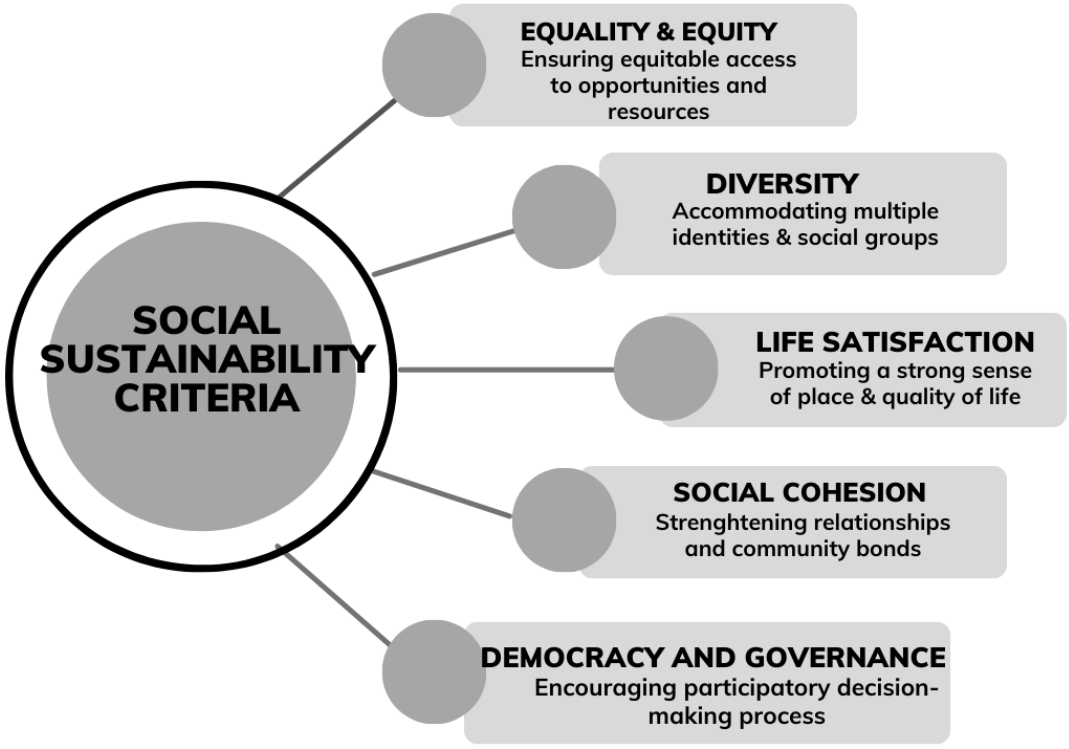

Figure 2.3 Criteria for social sustainability (prepared by researcher)

Social sustainability ensures equal opportunities and equitable resource distribution and service access for people from all socioeconomic levels, as well as every gender and ability group. According to Manzi et al., social sustainability happens through architectural spaces that promote inclusive social environments with equal accessibility and shared identity (Manzi et al., 2010). According to Landorf et al., (2008) participatory design and spatial justice are essential components for building sustainable communities (Landorf et al., 2008). Fincher and Iveson (2008) demonstrate that social sustainability requires inclusive urban and architectural designs that accommodate various identities and social groups to establish environments that support equity and cultural and social adaptability (Fincher & Iveson, 2008). Public areas with well-designed spaces alongside the availability of facilities and a strong sense of place all play a crucial role in determining quality of life, according to Marans and Stimson (2011). The built environment enhances quality of life through its combination of practical functionality alongside visual appeal and accessibility features, and community engagement. Compact connected environments reduce spatial segregation to support social sustainability while improving livability according to Burton (2000). Colantonio and Dixon argue that sustainable urban design needs to integrate both material elements, such as green spaces and infrastructure, along with immaterial aspects such as social capital and sense of identity (Colantonio &Dixon,

2011). According to Talen, the built environment needs to establish meaningful social connections because this factor directly affects how satisfied people feel with their lives (Talen, 1999).

Social cohesion serves as a vital criterion that describes the collective force that binds community members through their interpersonal bonds and solidary relations. This mindset brings together community members to work together while offering mutual support, which produces collective advantages for the entire group. A social cohesion system features robust interpersonal relationships together with fair resource distribution and equal opportunities alongside active community involvement (Chan et al., 2006). According to Forrest and Kearns (2001) well-planned spaces enhance social interaction and trust, which creates feelings of community belonging (Forrest & Kearns, 2001). Dovey agrees with this assessment by demonstrating that architectural design elements such as spatial organization and walkability, and public engagement help build stronger community connections while enhancing social resilience (Dovey, 2016).

Social sustainability relies on democratic governance to let communities actively participate in designing their built environments. Participatory decision-making serves as a method to empower citizens when they participate in architectural project planning and implementation. The inclusive decision-making process builds governance trust while keeping the built environment consistent with community values and aspirations. The United Nations supports participatory governance as a key element for developing sustainable cities and communities, as demonstrated through Sustainable Development Goal 11, which promotes inclusive and participatory decision-making for thriving sustainable urban environments (United Nations, 2015).

The university campus environment depends on equality and equity as well as diversity and social cohesion and life satisfaction and quality of life and democracy, and governance, since these factors define the student experience through student interactions and academic participation. These criteria enable universities to develop sustainable social environments while creating inclusive spaces that enhance student quality of life and adaptability to future social demands, and build holistic educational environments.

2.1.3 Quality of Life (QoL)

The concept of quality of life (QoL) represents a multi-dimensional construct that assesses a person's general life satisfaction by evaluating physical health alongside psychological well-

being and social connections, and environmental conditions (Felce & Perry, 1995). QoL exists as the result of two distinct life elements: objective life conditions like income and health status, and personal subjective feelings of satisfaction (Felce & Perry, 1995). Multiple fields of study have worked together to identify and define QoL, which has resulted in multiple interpretations.

The World Health Organization defines Quality of Life as how people assess their situation among the values of their culture and life goals, as well as their standards and concerns (World Health Organization (WHO), 1995). The four dimensions included in this assessment are physical health, psychological state, level of independence, social relationships, and personal beliefs. Rapley describes Quality of Life as a complete concept that combines personal feelings with outside objective wellness assessments (Rapley, 2003). According to Rapley, personal satisfaction exists in connection with the surrounding socio-environmental context.

Urban planning, together with architecture, uses this concept to create environments that foster human health alongside community prosperity. Marans and Stimson define quality of life as the combination of physical elements and social factors, and psychological aspects that determine a person's happiness in their surroundings (Marans & Stimson, 2011). According to Lawton (1982), quality of life results from the combination of spatial organization along with accessibility and environmental comfort and safety, and social opportunities. The physical environment directly affects quality of life through its impact on mobility, as well as sensory experience and social interactions, according to Marans (2015). Sustainable design techniques should create environments that support human well-being and social sustainability while maintaining ecological efficiency, according to Landorf, Brewer, and Puustinen (2008).

According to Maslow's Hierarchy of Needs (1970), human needs exist in five categories, which start from physical requirements, then move through safety and social attachment, before esteem and conclude with self-actualization needs. This model shows the relationship between real-world conditions and personal perceptions of well-being while providing an important structure for analyzing how these needs affect overall wellness. Quality of life exists in equilibrium between external resources and infrastructure alongside internal emotional and psychological states. Architectural planning needs to address Maslow's hierarchy of needs by designing supportive environments that promote human development and community strength.

The following table illustrates how needs fall into two categories between objective conditions and subjective experiences.

Table 1. summary of Maslow's Hierarchy of Needs categorization

Level of need	Subjective indicators	Objective indicators
Physical needs	Feeling satisfied with physical resources	Food, water, shelter, health
Safety requirements	Sense of security and stability	Secure housing, safety measures
Social needs	Sense of belonging, love, and inclusion	Opportunities for social interaction
Self-esteem needs	Confidence, respect, self-worth	Recognition, achievement
Self-actualization	Personal fulfilment and purpose	Opportunities for creativity and growth

At the physiological level, which is the lowest level of human needs, such as food, water, shelter, and basic healthcare, people are considered to have satisfied their physical needs. They are the most basic of QoL. This is because these needs are necessary for the well-being of humans and also for the development of other levels of satisfaction and quality of life. It is thus important that proper building planning is taken into consideration in the provision of this infrastructure since it determines the provision of safe and reliable access to these resources and thus the creation of a conducive environment for health and development of a society (Mitchell, 2000). According to Evans and McCoy (1998), however, poor indoor air quality and lack of thermal comfort in buildings can result in people's dissatisfaction and their health will be negatively affected.

The level of safety includes safety, health, tranquillity and safety from risks. Safety is a fundamental component of the quality of life of urban areas and it is therefore important for neighbourhoods to have low crime rates and good healthcare facilities so that residents can feel secure and contented and live better quality of life (Sirgy et al., 2006). Security is enhanced by such features as well illuminated public places, unblocked pathways and firm buildings (Newman, 1972). Also, safe and sound infrastructure and other features of sustainable urban development contribute to the security and resilience of communities in the future (Landorf, Brewer, & Puustinen, 2008).

At the social needs level, the human relations and community participation becomes relevant. Social needs are met through participation in family, community and society, where one feels a part of the group, supported by the group. Architectural features such as public parks, community centres, and other shared areas are vital in meeting these needs as they help in bringing people together and creating a sense of community (Talen, 1999). According to Leyden (2003), The design of pedestrian-oriented communities with lively public areas can be very effective in enhancing social interaction as these areas naturally bring people together and create a sense of community that can increase the quality of life (Leyden, 2003). According to Forest and Kearns (2001), public spaces such as parks, plazas and shared workspaces when well-planned can enhance social cohesiveness and enhance people's quality of life. Gehl (2010) also emphasizes that pedestrian-friendly and people-oriented urban areas increase interpersonal contact and reduce social isolation which in turn increases a person's sense of belonging.

At the esteem level, people yearn for admiration and self-esteem which can be encouraged by architectural design that helps in identity, empowerment and cultural identity. When people feel that they can contribute to the society and they are appreciated for their work, their self-esteem and happiness are raised. Thus, architects can contribute significantly to the improvement of the quality of life of people and communities, and the promotion of pride, dignity and happiness. For instance, University campuses should offer open and inclusive educational environments that foster the growth of intellect and creativity (Marans & Stimson, 2011). Also, the presence of historical monuments, works of art and different architectural solutions in cities increases civic pride and social identity (Fincher & Iveson, 2008).

Finally, the self-actualization level, which is the realization of one's potential and dreams, is the most important aspect of the quality of life as the last level of Maslow's hierarchy of needs. This is the dimension that is closely associated with personal development, imagination and striving for excellence, and it is the key to helping people live a meaningful and purposeful life. This can be done by incorporating parks, museums, and flexible workspaces that stimulate creativity and lifelong learning (Dovey, 2016). In the same way, Evans et al (2002) also state that, Beautiful and environmentally friendly designs also improve the mental health and quality of life. Also, environments that support self-actualization can greatly affect a person's general well-being since they give a person the necessary tools and means to grow and develop, thereby leading to a more authentic and meaningful life (Kevin Lynch, 1960)

2.2 Understanding The University Context

The definition of a university has undergone significant transformation over the years, reflecting changes in societal needs, technological advancements, and globalization. The fundamental principles of a university today are rooted in autonomy, academic freedom and a steadfast commitment to uphold the universal values of knowledge, learning and innovation (Observatory Magna Charta Universitatum, 2020).

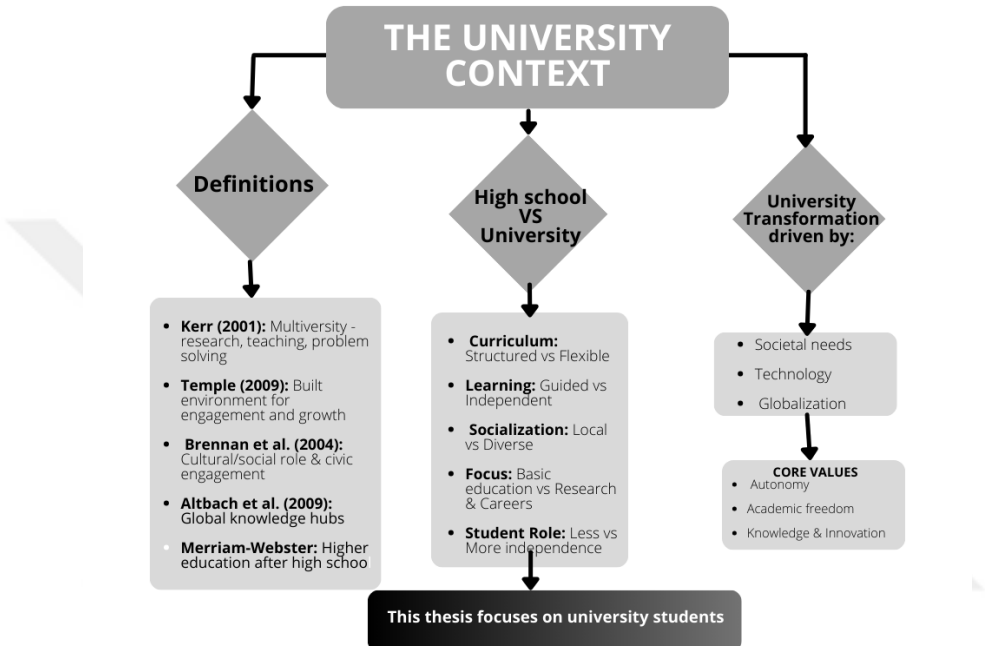

Figure 2.4 social sustainability concept (Researcher)

The research by Kerr (2001) defines a university as a complex organization that carries out various tasks such as research, teaching, and the practical application of knowledge. As explained by Temple (2009), a university is an area of learning that aims at developing the student, socially and academically, and enhancing their creativity through the design of the learning space. As explained by Brennan et al. (2004), universities are social and cultural institutions that shape identities, beliefs, and the progress of society apart from being learning institutions, and this paper will focus on the role of universities in enhancing civic engagement and critical thinking. Furthermore, a university is a global knowledge center according to Altbach, Reisberg, and Rumbley (2009), who discuss its role in cross-cultural communication, international education, and economic development.

The Merriam-Webster dictionary defines a university as an institution of higher learning that offers courses in various fields of study to develop the intellect and advance society (Merriam-Webster, n.d.). This means that universities are the next level of education after high school. This is a level of education that is similar to high school in the sense that it is a type of formal education, but it is different in that it is a higher level of education.

High schools and universities are different in several ways, including the system of education, the level of independence, and the surroundings. Some of the differences are: The curriculum in universities is more flexible with electives in addition to the core courses (Cohen, 2012). Students are allowed to select their areas of interest and are required to be more independent in their learning and are expected to carry out their own research, analysis, and decision making (Kember, 2013). The social structure is more or less based on peer relationships, and students' activities are more structured and monitored.

High school is a relatively small community, and the students are close to each other, and the school has a close-knit culture (Jackson, 2015). On the other hand, university campuses are more diverse and larger, with students from different cultural, geographical, and academic backgrounds (Tinto, 2012). Also, universities are usually large and are not only concerned with education but also with research and career development (Temple, 2009). Some universities have separate postgraduate and graduate programs, which is not typical for high schools. The research focus of universities is the opposite of the conventional teaching style used in high schools (Shulman, 2005).

While both high school and college students are in the process of learning and growth, university students are at a higher level, more independent, and more self-dependent, receive more specialized and in-depth education, and are more prepared for adulthood and career. This thesis focuses on university students.

2.2.1 The University Campus

A university campus is a carefully planned setting that harmoniously unites purpose and beauty to bring people together and encourage teamwork and innovation, thus creating a lively and productive environment that supports the educational and social activities of its users (Dober, 2000). These campuses' built environment, which includes buildings, outdoor spaces, and amenities, is very important in the students' socialization and overall quality of life. It is important to know the impact of the design and arrangement of educational campuses on students' health and cohesion to develop supportive learning environments. These spaces

support versatile teaching methods, including collaboration, project-based learning, and experiential learning.

The campus is a small-scale version of society, and in a way, the campus is the embodiment of the university's goals and principles and the university's contribution to intellectual and cultural development. It offers a special context for individual development, socialization, and intercultural competence, influencing the minds and experiences of its community members. (Kenney et al., 2005). They are active environments in which students participate in various social and academic events that influence their learning experience.

2.2.2 facilities and opportunities on university campuses

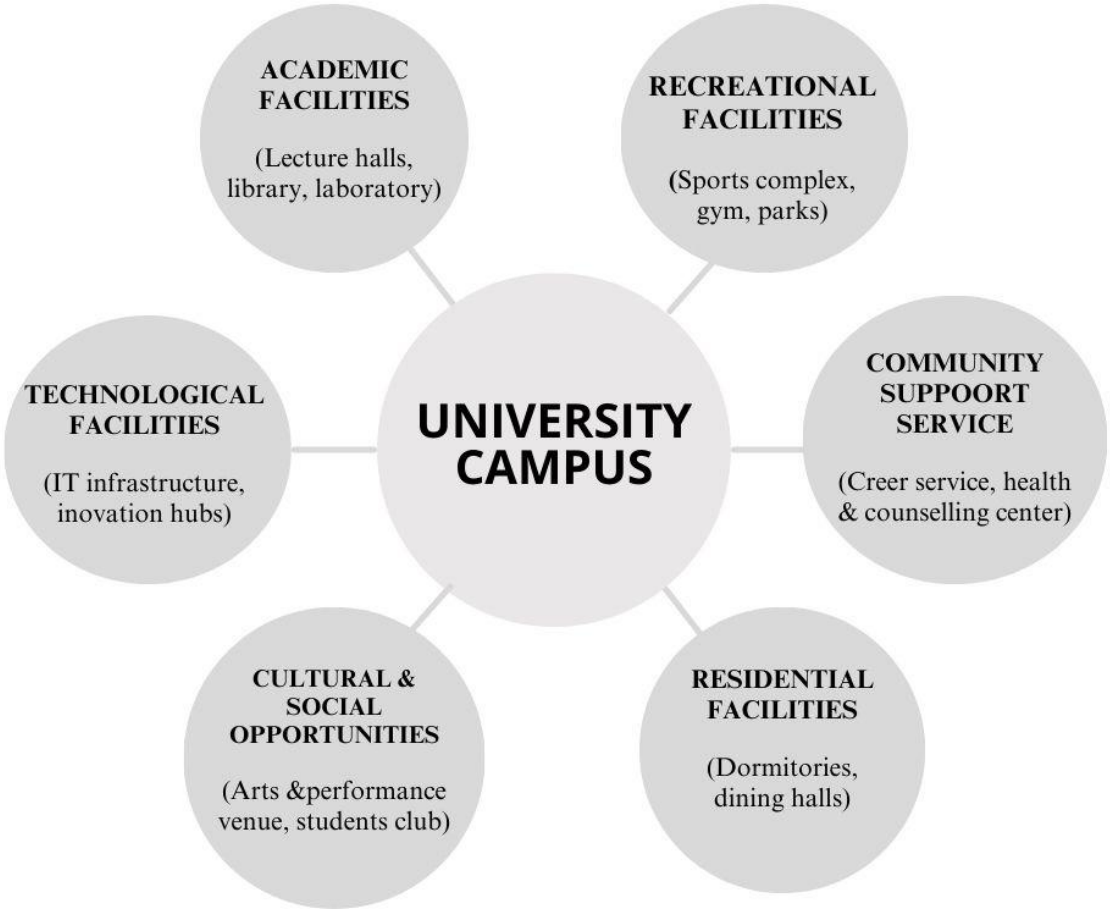

Figure 2.5 Facilities and opportunities on university campuses

The University campuses serve as venues that provide multiple facilities that help students learn and do research, and develop as individuals. The facilities can be grouped into academic

facilities and residential facilities and recreational facilities and cultural facilities and community-focused facilities, and technological facilities.

On university campuses, academic facilities include lecture halls and classrooms equipped with state-of-the-art technology for the improvement of the learning process (Temple, 2008), libraries that are a storehouse of knowledge with physical and digital resources as well as quiet and collaborative study spaces (Bennett, 2006), and laboratories and research centres, which offer specialized environments for hands-on learning and innovation in fields of science, engineering and technology, and encourage a culture of experimentation and discovery (Dober, 2000).

The universities have different types of residential facilities that serve the students and staff, including dormitories and apartments, which are safe and convenient for living (Schneekloth & Shibley, 2000), which help in the formation of a community and social interaction among the residents. Besides, dining halls and cafeterias are places where students come to eat and socialize, and are therefore important in the creation of a welcome and inclusive campus culture.

The community members of the university are considered and taken care of in terms of physical and mental health by providing a number of recreational and athletic facilities such as sports complexes and gyms where one can engage in individual and team sports, fitness programmes, and wellness activities (Balsas, 2003). University campuses also have parks and green spaces that serve as recreation areas, relaxation areas, and environmental conservation areas where students and staff can relax, engage in outdoor activities, and even recharge and reconnect with nature, which contributes to a better and more balanced life.

Campus life for students is enhanced through the existence of numerous activities and venues that students can use. It has places such as theatres, art galleries, and studios where students can be creative, watch cultural and social performances, and also learn and grow. Many different student organizations and clubs are available to students, and these clubs enable students to make new friends, learn new things, and take on leadership roles, which can help students to grow in many ways (Kenney et al., 2005).

As pointed out by Reardon (2014), universities have several community and support services. University counseling centers are also present, and these centers are run by licensed professionals who offer both individual and group therapy sessions (Reardon, 2014). These services are aimed at fostering a supportive environment that considers the emotional and

psychological needs of the students (Hyun et al., 2007). For instance, career services offer students a wide range of services such as internship placements, job placement, and career guidance, which in turn help them in their career development. To ensure that students can get the care and support that they need to excel, there are health and counseling facilities that provide students with physical and emotional support. These services not only lead to better academic performance but also help to reduce the feeling of loneliness by creating a collaborative atmosphere in which students can engage with each other. For instance, the international students' services, which help students from different cultures transition and settle into university life and make them feel at home, are also provided.

Today's university campuses are furnished with modern technological equipment that aids in learning, research, and teamwork. For example, innovation hubs and maker spaces allow students to collaborate and work on their entrepreneurial ideas and make prototypes, which creates a culture of innovation and entrepreneurship. Additionally, campuses boast robust IT infrastructure, including high-speed internet, e-learning platforms, and computer labs, which enable students to access a wide range of digital resources, engage in online learning, and develop essential technical skills, which in turn, improve their academic and professional life (Bennett, 2006).

2.2.3 Student satisfaction in campus life

Multiple scholars have thoroughly explained and investigated student satisfaction in campus life. Elliot and Shin (2022) define student satisfaction in campus life as the level of happiness students experience during their university attendance (Elliott & Shin, 2022). The evaluation depends on how well the university facilities and services, and the environment fulfill student needs and expectations. The evaluation encompasses their contentment with academic experiences, along with social encounters and individual development opportunities.

According to Jamieson (2003), student satisfaction describes the extent to which a university campus's physical design supports academic engagement and social involvement (Jamieson, 2003). The argument asserts that properly designed educational facilities boost student learning capabilities along with their general academic experience. According to Hassanain (2008), well-maintained student apartments with proper thermal comfort, privacy, and common areas create a positive campus atmosphere that links housing standards to student contentment (Hassanain, 2008). Radwan et al (2020) demonstrate in their 2020 study that biophilic design

improves student satisfaction because students who access daylight and green spaces and nature experience better mental health and academic results.

The scholars share similar views by agreeing that student satisfaction in campus life results from spatial design, alongside accessibility and housing quality, and built environment interaction. The assessment of student satisfaction consists of multiple components which include academic learning spaces and recreational facilities and support services quality, and overall campus appearance. Student satisfaction indicates the success of a university in creating supportive, positive learning environments for its student body. The relationship between student satisfaction and student engagement in campus life has been strongly demonstrated by Umbach and Porter (2002). Students generally show higher satisfaction with their university education through their active participation in academic and social activities beyond classroom attendance (Umbach & Porter, 2002). Student involvement in different campus activities creates positive effects on their educational satisfaction levels.

The two concepts of general satisfaction and student satisfaction exist as separate entities. General satisfaction describes an individual's overall emotional state of contentment, which extends across personal life domains and professional life domains as well and social life domains. The evaluation covers a wide range of emotional and psychological aspects and external life conditions that affect a person's feelings (Diener et al., 1999). Student satisfaction focuses on the academic environment of educational institutions, while general satisfaction assesses life experiences in various contexts. The definition of student satisfaction by Hill (1995) explains it as the level at which students believe their academic and social and personal requirements are fulfilled by the institution. The assessment of satisfaction in this context focuses primarily on teaching quality, alongside facilities and services, and educational experiences. Student satisfaction functions as a performance indicator of educational institutions because it links directly to institutional success and student achievement outcomes.

General satisfaction differs from student satisfaction because they operate on different levels of measurement. The two concepts differ in their extent since general satisfaction covers different domains of life, but student satisfaction specifically assesses educational facilities that fulfill student needs. The distinction between general satisfaction and student satisfaction demonstrates the exclusive nature of student satisfaction within educational institutions. Understanding this distinction is important, as it highlights the unique aspects of student satisfaction and its significance in the context of educational institutions.

2.2.4 Architectural Criteria Necessary for Campus Design

University campus design presents a complicated challenge that demands proper examination of multiple architectural features to establish areas that support academic success and social engagement, and environmental protection. A campus requires specific architectural criteria during the planning and design stages to reach this goal. The design criteria consist of: Functionality and flexibility, accessibility and inclusivity, integration with nature, sustainability, connectivity and mobility, safety and security, and technological considerations. The design of university campuses requires functional elements and flexible approaches because these institutions must support different academic programs and student activities alongside the evolving requirements of students and staff members. The integration of functionality with flexibility in campus planning creates long-term sustainability while enhancing user experiences and maintaining built environments relevant to changing educational approaches and institutional priorities (Duffy, 2008). The nature of a university as an innovation center and idea incubator requires campus spaces to have flexible designs that can adapt to changing educational requirements and teaching approaches (Wiewel & Perry, 2005). The ability to adapt is crucial for modern education because it supports both interdisciplinary collaboration and experiential learning, which gain greater emphasis (Oblinger, 2006).

University campuses must design facilities that are accessible and inclusive to guarantee equal access to all facilities and services for students of all abilities. Universal design principles extend past basic accessibility requirements to generate authentic usable spaces for everyone (Steinfeld & Maisel, 2012). University campuses become inclusive spaces through universal design principles that generate areas which serve functional needs while being welcoming to students with different abilities and learning backgrounds (Steinfeld & Maisel, 2012). The university campus achieves a seamless inclusive experience through features which include ramps together with elevators and clear signage and accessible pathways and ergonomic furniture, and intuitive wayfinding systems.

According to Afacan (2021), an inclusive campus design includes rooms for quiet study and collaborative spaces and sensory-friendly zones for neurodiverse students who require different learning environments. Tweed and Boeri demonstrate how inclusivity manifests through the architectural design of student housing and recreational facilities. Student facilities, including gender-neutral restrooms and prayer rooms and lactation rooms, and multi-faith

centers, serve the various cultural and religious requirements of students (Tweed & Boeri, 2012).

Green spaces, along with courtyards and gardens on university campuses, serve as relaxation areas for students and staff while providing outdoor learning spaces and recreational zones, which directly affect their mental health and productivity levels. Campus landscapes that receive proper design benefit students through social interaction and mental health improvements while enhancing their cognitive abilities (Kellert, Heerwagen, & Mador, 2008). Beatley (2016) explains that universities featuring vertical gardens along with green roofs and landscaped courtyards create peaceful areas that enhance staff and student concentration and decrease stress. These spaces serve as biodiversity habitats while enhancing social sustainability and making the campus environment more attractive (Turner, 2016). Biophilic design principles enable campuses to restore natural connections between users and the environment by utilizing benefits from sunlight and ventilation, and green spaces to establish sustainable, supportive spaces (Beatley, 2011).

University campuses possess the distinctive capability to advance sustainability while lowering their environmental impact by using strategic planning and design approaches. The design principles for sustainable campuses combine energy-saving measures with resource protection alongside climate-friendly architecture and sustainable building materials (Altomonte, 2008). University campuses that implement these design elements establish healthier educational settings and achieve substantial environmental protection. The design of sustainable campuses promotes walking and cycling as modes of transportation, which in turn decreases fossil fuel consumption and promotes environmentally friendly behavior.

The implementation of passive design approaches eliminates the need for artificial heating and cooling systems, which leads to significant energy savings. High-performance insulation together with natural ventilation and strategic building positioning are part of these strategies (Lechner, 2014). The implementation of renewable energy systems, including solar panels and wind turbines, and geothermal heating, allows universities to eliminate their dependence on fossil fuels while reaching a net-zero energy status (Steffen, 2019). Rainwater harvesting systems, along with green roof installations, provide resource conservation and waste reduction capabilities. The research supports Kellert et al., who recommend that campus buildings should be designed to match their natural environment while using efficient energy technologies and renewable power systems (Kellert et al., 2008). Through these principles, universities can

establish leadership roles that show environmental responsibility and motivate community members to practice sustainability.

The campus design needs both connectivity and mobility features to enable students and staff to move throughout the university space effectively and harmoniously. A properly designed university campus includes different transportation choices that serve diverse mobility requirements by placing bike lanes together with walkways and public transit points, and parking facilities that optimize access (Banister, 2008). The UI GreenMetric sustainability ranking system has recognized Nottingham Trent University and the University of Groningen for their pedestrian-friendly campus designs through their accessible pedestrian network features (UI GreenMetric, 2023). The transit-oriented design of a campus reduces the requirement for personal vehicles, which in turn reduces traffic congestion and decreases environmental carbon emissions (Newman & Kenworthy, 2015).

Security and safety serve as fundamental design elements for campuses because they enable staff and students to engage in academic and social activities while protected from threats and risks. Security plans for campuses achieve safety through balanced measures, which create controlled areas that welcome students while supporting social sustainability (Newman, 1972). The combination of building access through keycards and security gates and strategically located security personnel helps to control traffic flow without compromising the welcoming environment (Saville & Cleveland, 2013). The combination of interactive digital maps and visible signage enables people to navigate unfamiliar areas, which results in reduced anxiety and improved campus experiences (Arthur & Passini, 2002). Safety and security considerations during design enable universities to build spaces that promote both inclusivity and successful outcomes for their students.

The evolution of universities requires campus architecture to implement smart infrastructure and high-speed connectivity, along with adaptable learning spaces to support academic and social activities. According to Oblinger (2006), integrating technology results in better educational delivery and creates sustainable spaces while improving accessibility and user experience (Oblinger, 2006). According to Mitchell, the implementation of digital technologies within built environments enables campuses to transform into dynamic learning centers that unite students and faculty members, and staff for knowledge sharing and collaborative projects (Mitchell, 1999). The integration of Wi-Fi systems and smart classrooms

and digital collaboration spaces represents essential components that allow students and staff members to participate in modern and productive learning experiences

2.2.5 Evaluation of Architectural Criteria Necessary for Campus Design

The essential architectural criteria for effective campus design emerge from Section 2.2.4 analysis into two fundamental domains: physical criteria related to built environment structure and space, environmental aspects and social criteria, which focus on experiential quality and user-centered inclusivity.

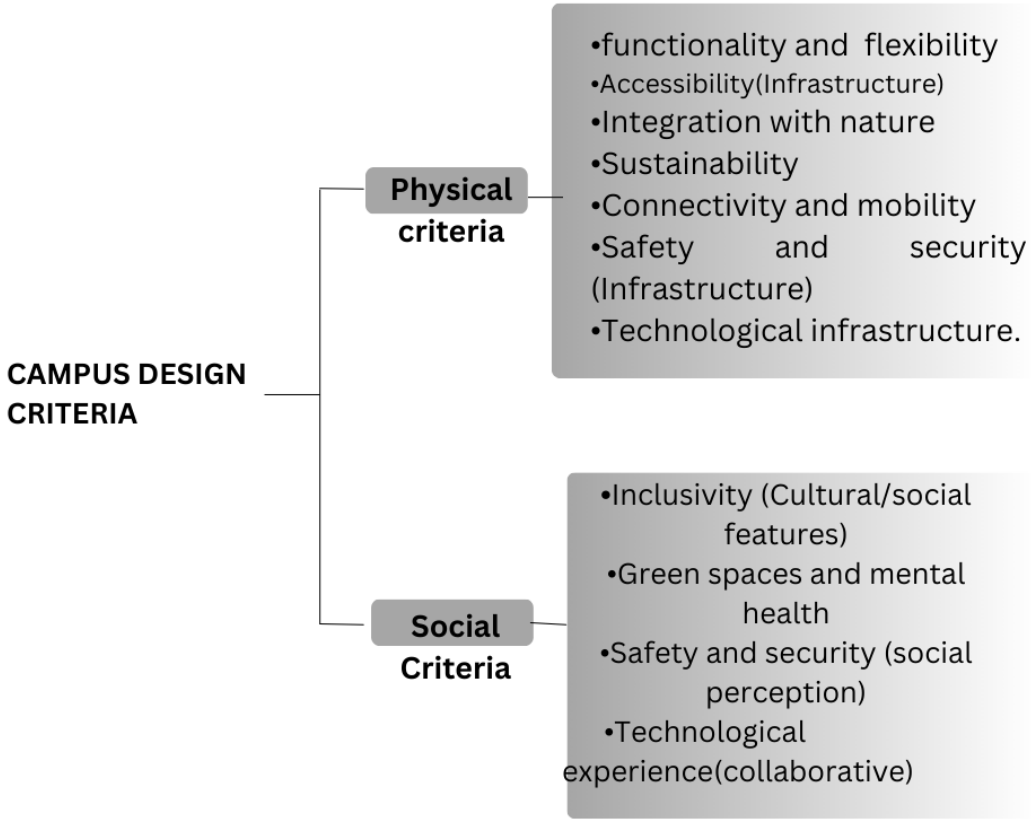

Figure 2.6 Campus design criteria (Prepared by researcher)

The questionnaire named "The Impact of the Built Environment on Students' Social and Cultural Sustainability in Educational Campuses" was designed to explore the relationship between the built environment and student social and cultural experience according to the architectural criteria established earlier. The questionnaire assessed how the built environment supports comfort, inclusivity, and social interaction by incorporating questions related to physical attributes such as accessibility, spatial organization, green spaces, and mobility, and social dimensions such as safety, cultural inclusivity, and opportunities for social engagement.

The instrument was designed to capture a comprehensive understanding of how campus design influences students' perceptions of social and cultural sustainability by framing the questions around these criteria.

This approach reinforces the relevance of these architectural principles and provides empirical grounding for the theoretical framework established.

2.2.6 Review of existing university campuses

This study will explore six university campuses, which are divided into two categories: three international universities (category 1) and three universities in Istanbul (category 2). The international case studies provide a glimpse into global best practices and innovative designs in campus architecture and how different institutions around the world approach social sustainability. The Istanbul campuses will offer valuable insights into how local universities adapt and respond to the unique challenges of fostering social sustainability in their specific context. The university campus design for review was chosen based on its ranking in the 2024 UI GreenMetric rankings.

CATEGORY 1 OF UNIVERSITY CAMPUS DESIGN REVIEW

- **Nottingham Trent University (NTU)**

Nottingham Trent University (NTU) is a well-known public university located in Nottingham, United Kingdom, which was established in 1992. It was ranked as the second most sustainable university in the world (2024 UI GreenMetric rankings). NTU has quickly become one of the top institutions in the world, known for its focus on sustainability and quality education. The university has its campuses located in the City Campus, Clifton Campus, and Brockenhurst Campus, and each of them has modern facilities and a lively academic atmosphere.

Nottingham Trent University is known to be one of the most sustainable universities in the world and has been ranked among the top universities in the world in terms of sustainability. NTU has been ranked as the second most sustainable university in the world for the second year running, according to the UI GreenMetric World University Rankings, which ranked over 1,183 universities from around the world (Nottingham Trent University, 2023). This recognition shows that NTU has taken a holistic approach to making its campuses more sustainable by creating green spaces, building green buildings, and developing green transportation systems.

Nottingham Trent University has a strong commitment to social action and cultural activities, which has created a diverse and vibrant community and thus makes it a good case study to explore how the built environment affects students' social and cultural experiences. By studying the university's campus design and sustainability initiatives, researchers can learn more about how architectural and environmental strategies can be used to promote social and cultural sustainability in university settings. This can be useful to understand how to create inclusive and vibrant campus environments that can support the well-being and development of students from different backgrounds

.**NTU campus design and planning**

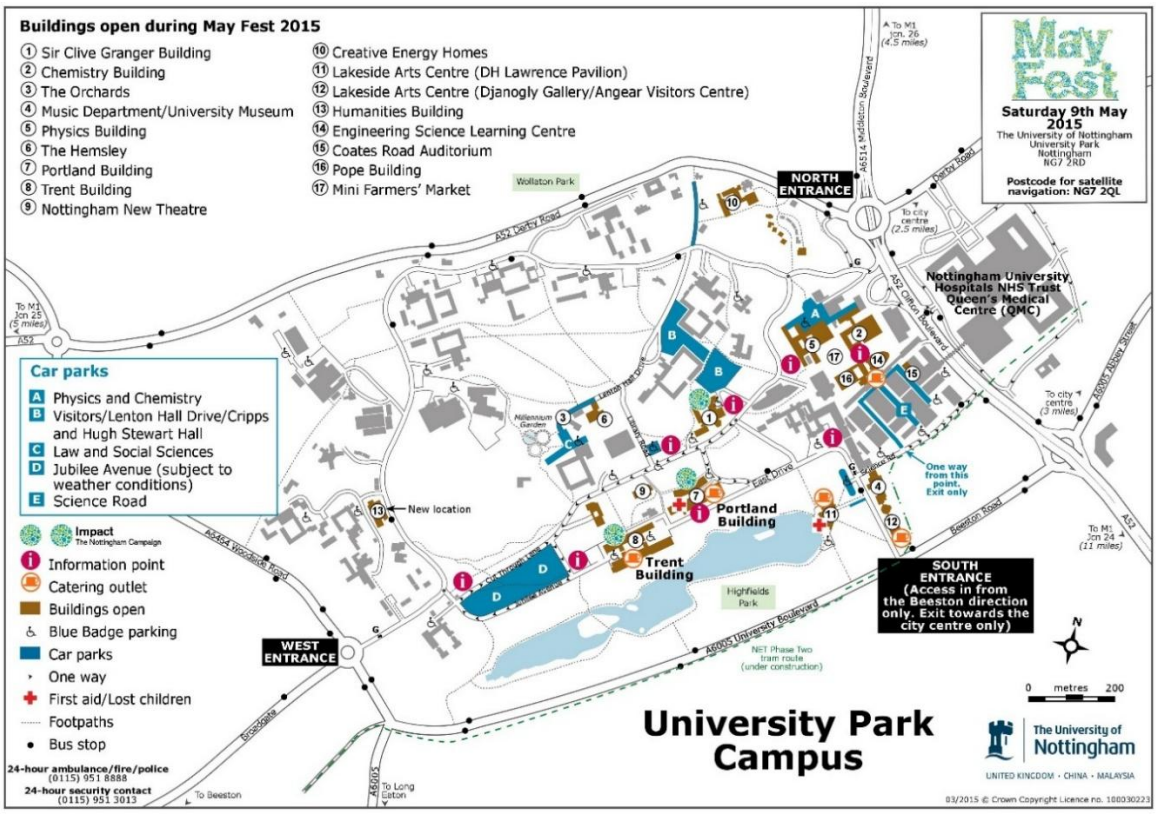

Figure 2.7 Nottingham University campus map (gadgets2018blog.blogspot.com)

The campus design at Nottingham Trent University (NTU) establishes a balanced sustainable environment through its organized structure. The academic and residential and recreational facilities at Nottingham Trent University (2020) are organized into separate zones which provide a functional and accessible space for students and staff. The built environment at NTU combines with natural landscapes through features such as parks and green roofs and water features to establish a balanced eco-friendly atmosphere (Nottingham Trent University, 2023). The City Campus at the university features both a rooftop garden and a pond which provide

peaceful areas for students and staff members (Nottingham Trent University, 2020). The University campus uses sustainable designs with innovative approaches and building forms and materials across its entire infrastructure. The NTU campus architecture and design show its dedication to sustainability by building a successful community space.

NTU Social sustainability features

Figure 2.8 Nottingham Trent University student Union Building. (www.alamy.com)

The community building at Nottingham Trent University (NTU) exists through different spaces which promote social interaction. The Student Union building functions as a central location for student activities because it contains cafes and bars and event spaces that unite students (Nottingham Trent University, 2020). Students can use the social areas of the Pavilion building to meet and unwind with their peers (Nottingham Trent University, 2023). The university demonstrates its commitment to accessibility by implementing features, including ramps and elevators and inclusive design elements for students with diverse needs. The City Campus at the university features complete accessibility through its audio-visual alarm system and braille signage.

Figure 2.9 Nottingham Trent Pavilion. (www.adamcoupe.com)

The campus of Nottingham Trent University (NTU) has a substantial effect on student and staff academic and social life. Students and staff members benefit from shared spaces, including libraries, study hubs, and green areas, which promote collaboration and social interaction and create a sense of belonging. The university libraries at Nottingham Trent University (2023) provide students with different study environments through quiet areas and group study rooms, and social learning spaces that help students academically and socially connect. NTU's green spaces serve as peaceful environments that help students relax while they socialize informally to enhance their general well-being (Nottingham Trent University, 2020).

The National Student Survey (NSS) shows that NTU achieves better results than the national average in teaching quality and learning resources categories (Office for Students, 2023). Students praise the university's contemporary facilities and its dedication to sustainability because these factors create positive impacts on academic and social campus life (Nottingham Trent University, 2023). Staff members at the institution value the campus's easy accessibility and its sustainable practices and supportive workplace environment (NTU Annual Report, 2023). The NTU Staff Feedback Report (2023) identifies two major problems, which are insufficient parking spaces and insufficient collaborative areas for interdisciplinary research. The rising need for mental health services along with public transportation accessibility issues demonstrates the necessity of ongoing student support infrastructure investments (Nottingham Trent University, 2023). The university needs to resolve these issues to preserve its campus environment as resilient and inclusive, and future-ready.

- **University of Groningen** (Netherlands)

The University of Groningen, which holds the 3rd position globally in UI GreenMetric rankings established its operations in 1614. The institution stands as one of the Netherlands' oldest and most respected educational institutions. The institution operates from Groningen city while maintaining a historical commitment to academic progress and excellence. The QS World University Rankings, together with the Academic Ranking of World Universities (ARWU), recognize the university for its broad research activities and diverse academic offerings, which position it among the global top 100 universities (University of Groningen - Top 100 University, 2017). The institution demonstrates its dedication to social and cultural sustainability through its inclusive policies and strong student support networks and community involvement, and well-being programs (University of Groningen, History and Profile of the University of Groningen).

The campus of Groningen presents an exemplary combination of contemporary and traditional architectural elements, which reflects the university's mission to preserve tradition alongside its open approach to innovation. The university maintains its position as a leader in environmentally friendly programs through its green infrastructure, which resulted in its high ranking in the UI GreenMetric rankings (UI GreenMetric, 2024).

University of Groningen campus design and planning (Physical features)

The University of Groningen Campus design integrates various functional zones, including academic buildings, research facilities, student accommodations, and recreational spaces, creating an environment conducive to both intellectual and social growth (University of Groningen, n.d.). The University of Groningen campus is characterized by a decentralized yet cohesive layout where the main faculties and buildings are interwoven with the city’s urban

fabric. This integration fosters a strong connection between the university community and the city of Groningen.

Figure 2.10 Academy building, University of Groningen (www.pinterest.com)

The University of Groningen focuses on green infrastructure through energy-efficient buildings and extensive cycling paths, and well-maintained green spaces. The features enhance both the environmental health of the campus and promote better health habits among students and staff members. The university's planning includes adaptable learning environments together with collaborative areas that serve the changing requirements of its diverse student body. The campus features well-equipped lecture halls alongside informal study areas located in libraries and cafés, which support academic and extracurricular activities. The university supports a complete educational experience through its recreational facilities, which include sports complexes and cultural centers (University of Groningen, n.d.). The International Student Barometer (2022) survey revealed that students highly appreciated the university's outstanding academic resources, together with its contemporary facilities and helpful staff members.

University of Groningen Social sustainability features

The University demonstrates social sustainability through its dedicated focus on diversity and inclusion practices. The institution welcomes students from more than 120 countries, which positions it as one of the most international universities in the Netherlands (University of Groningen, 2023). The diverse student population allows institutions to develop inclusive spaces that honor different cultural backgrounds and support socialization activities (Museus

& Smith, 2014). The institution builds a worldwide community through its programs that enable students to work together across different cultural backgrounds (University of Groningen). The University of Groningen leads the way in social sustainability through its combination of policies and campus design, and community engagement initiatives. The Harmonie Complex within the campus center serves as an example by providing open study areas and event spaces that connect academic activities with social life for students and public visitors.

Figure 2.11 Groningen University harmonie complex (www.alamy.com)

The university's planning includes adaptable learning spaces and collaborative areas, which serve to fulfill the changing requirements of its diverse student body. The campus features both formal lecture halls and casual library and café study areas that support various academic and extracurricular pursuits. The campus life is enriched through recreational facilities that include sports complexes and cultural centers, which support a holistic educational approach (University of Groningen, 1997). Institutions can develop an environment that supports student and staff holistic development through space planning, which respects campus community diversity (Postalcı & Atay, 2019). The university supports sustainable transportation through its large cycling system and public transit options, which provide mobility for all university members (UI GreenMetric, 2024).

The University of Groningen demonstrates social sustainability through its policies and practices by developing an inclusive community that supports both personal and academic development. The university has established itself as a sustainable higher education model through its initiatives, which received recognition in UI GreenMetric global sustainability rankings (UI GreenMetric, 2024).

The University of Groningen achieves high marks in various aspects but faces two main issues, which include insufficient student housing and insufficient informal study areas during peak times, according to user feedback (Groningen University Council, 2023).

- **Taylor's University (Malaysia)**

Taylor's University operates as a private educational institution based in Subang Jaya, Malaysia. The UI GreenMetric World University Rankings placed the institution at position 79 globally in 2024. The 27-acre Lakeside Campus of the university features a 5.5-acre artificial lake, which is encircled by tropical vegetation. The campus design achieves a perfect equilibrium between architectural elements and operational needs to create an advantageous educational environment for learning and personal development, and recreational activities. Taylor's University maintains its position as one of Malaysia's largest private universities through its enrollment of more than 19,000 students from over 100 countries in 2023.

Figure 2.12 Taylor's University Campus plan. (www.mungfali.com)

Campus design and planning of Taylor's University (Physical features)

Taylor University's Lakeside Campus in Subang Jaya, Malaysia, demonstrates effective integration of student-centered planning with technology integration and sustainable architecture design. The campus has received scholarly attention for its architectural and infrastructure features, which support student study and wellbeing. The "X-Space" structure developed by the university represents a significant advancement in classroom architecture. The collaborative classroom facility described by Han et al. (2014) emphasizes flexibility and adaptation while promoting student engagement, which aligns with modern educational methods that emphasize interactive and participatory learning experiences.

Figure 2.13 Taylor's University X-Space structure (www.myunivillage.co)

The campus facilities for academic and recreational purposes surround a 5.5-acre artificial lake, which serves as the central element of the campus design. The integration of natural elements establishes a peaceful educational space that supports both faculty and student mental wellness and enhances building visual appeal (Eco-Campuses: Sustainable Architecture throughout the Globe, 2023). The campus demonstrates a complete dedication to environmental stewardship through its implementation of waste reduction methods and energy-efficient technologies, and green building practices (Eco-Campuses: Sustainable Architecture throughout the Globe, 2023).

Social sustainability features at Taylor's University

Taylor's University demonstrates strong social sustainability through its strategic campus design combined with its student-focused, inclusive environment. The institution stands out because its student body includes students from more than 80 different nations who help create an inclusive educational environment (Taylor's University, 2024). The institution actively promotes intercultural interaction through student groups and international mobility initiatives, and multicultural festivals. The programs established by Lim and Cheah (2017) enhance both cultural understanding and social unity between students on campus.

The campus features extensive green areas together with a 5.5-acre artificial lake, which serves both practical and visual purposes. The campus designers integrated natural elements into the design to create spaces where staff members and students can relax while maintaining their well-being. Research shows that students benefit from natural environments because these areas create peaceful settings that reduce stress while improving focus (Shuib et al., 2015). The campus maintains high safety standards because it features well-lit public areas, together with surveillance systems and continuous on-site security presence. The strategic design of the

campus, combined with its prominent location in key pedestrian areas, creates a safe environment, which research shows leads to increased student comfort and security (Abdullah et al., 2016). The university enhances security and care by conducting regular safety drills and providing counseling and health services to students.

The University supports collaborative learning through its modern technological infrastructure that enables group work and project-based learning, and hybrid instruction to promote peer collaboration and social interaction (Yunus et al., 2014). Students have shown positive reactions to digital tools and platforms that enhance their academic engagement and connectedness, according to Yunus (2018).

CATEGORY 2 OF UNIVERSITY CAMPUS DESIGN REVIEW

- **Yıldız Technical University**

Yıldız Technical University (YTU) was established in 1911 as a public technical university and one of the oldest educational establishments in Istanbul, Turkey. It is ranked 59th in the 2024 Global UI GreenMetric rankings. It has several campuses, including the large Davutpaşa Campus in Esenler and the historic Yıldız Campus in Beşiktaş. YTU has a student population of approximately 39,000 students from diverse backgrounds and offers a wide range of programs in engineering, natural sciences, and social sciences (Wikipedia Contributors, 2024).

Campus design and planning of YTU (Physical features)

Figure 2.14Yıldız Technical University campus map (www.behance.net)

The YTU campuses are designed to integrate historical architecture with modern sustainability practices. The Davutpaşa Campus is a good example of this integration by preserving historical structures and incorporating green spaces and sustainable infrastructure. The campus has permeable pavements and enhanced drainage systems to manage water sustainably, which in turn helps in energy saving and cost reduction. (Campus and Infrastructure – Smart Green Campus, 2025).

Social sustainability features at YTU

The Yıldız Technical University (YTU) demonstrates a robust dedication to social sustainability through its advanced technological infrastructure and its well-designed green spaces, and its inclusive policies and safety measures. The institution promotes inclusivity through its Equal Opportunity and Anti-Discrimination Directive and Gender Equality Plan, which establishes a welcoming environment for students from different backgrounds (YTU, 2023a). The Davutpaşa Campus features extensive green spaces, including courtyards and gardens that enhance mental health while providing areas for relaxation and social interaction (YTU, 2023b). Eans (2019) found that green sustainable environments create positive effects on student happiness and well-being, thus supporting the link between social sustainability and environmental responsibility.

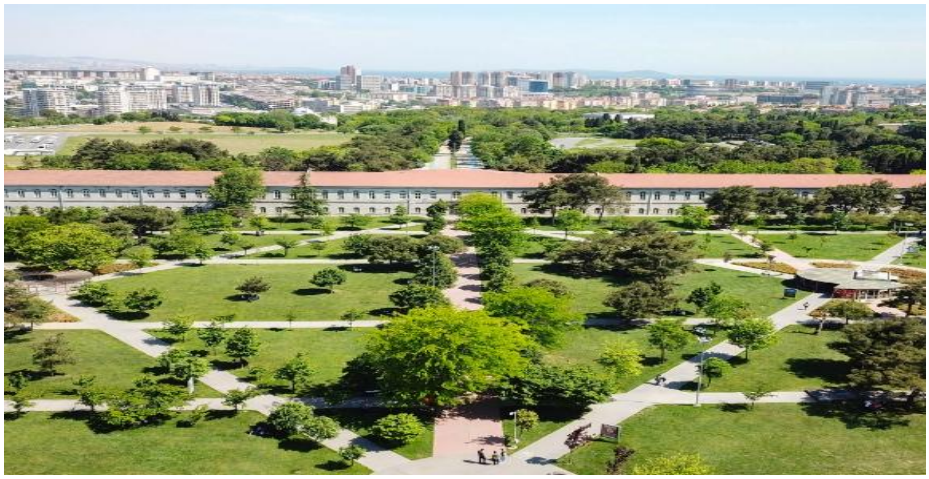

Figure 2.15 Part of YTU campus green area and linked walkways (Yildiz.edu.tr)

The YTU Sustainable Campus Commission (2023) states that safety is reinforced by comprehensive security measures and open areas that encourage social interaction and create a safe and inviting environment. YTU has invested in digital learning platforms, campus-wide internet access, and smart classrooms that promote technological engagement and collaboration, which fosters social connectivity and academic innovation (YTU, 2023c).

- **Özyeğin University (ÖzU)**

The private non-profit university Özyeğin University (ÖzU) was designed by RMJM. The institution is located in Istanbul, Turkey (Ozyegin University Live, 2024). The 2024 UI Metric Green Ranking positions the institution at the 82nd position worldwide. The Hüsnü M. Özyeğin Foundation established the university in 2007 to drive Turkish societal progress through service sector programs and modern educational systems, and innovative frameworks. The university offers undergraduate and graduate degrees through its various faculties, which include business, engineering, social sciences, aviation and aeronautical sciences, law, architecture and design, and applied sciences, among others (Wikipedia Contributors, 2024a). The university prepares students for worldwide professions by emphasizing multidisciplinary collaboration, together with research and real-world experience. The main campus at Çekmeköy features green spaces with modern facilities that support academic and recreational activities while maintaining sustainability principles. The university has achieved notable positions in international rankings because it prioritizes academic excellence and civic engagement.

Campus design and planning of (ÖzU) (Physical features)

The campus design of Özyeğin University follows international university campus standards through its sustainable and adaptable functional design. The architectural firm ARUP created the campus design, which provides adaptable infrastructure to support the academic and social needs of staff and students. The campus design includes segmental lecture halls and open-plan labs, and reorganizable areas that support solitary and group study needs for various academic activities while demonstrating high functionality and adaptability. The Community-Academic Research Links (CARL) initiative demonstrates this commitment through its program, which links students and faculty to community groups for developing solutions to real-world problems (O'Mahony et al., 2018).

Figure 2.16 Özyeğin University Campus (www.egitimajansi.com)

The campus provides step-free access combined with ramps, elevators, wide corridors, and user-friendly navigation systems, which enable easy mobility for people with special needs or impairments. The campus borders expansive green areas, which include properly maintained courtyards and nature walks and open green fields that feature designated bike lanes and pedestrian walkways, and shuttle services for effective mobility. The design also encourages integration with nature. The spaces provide both ecological benefits and create environments that enhance staff and student mental health through their calming and restorative qualities.

The campus infrastructure includes advanced surveillance systems, together with limited access points and emergency response protocols to maintain a secure environment. Security personnel maintain a continuous presence to monitor the area and assist students while the campus lighting system provides optimal visibility throughout the night. Özyeğin University implements technology infrastructure through its provision of interactive digital boards and high-speed Wi-Fi access and smart classrooms, and specialized innovation labs. The resources at Özyeğin University support its mission to foster creativity and multidisciplinary collaboration through an engaging educational experience that connects students with technology.

Social Sustainability Features at Özyeğin University

The social sustainability commitment of Özyeğin University (ÖzU) becomes evident through its programs that focus on safety alongside mental health support and diversity promotion, and cooperative technology experiences. The institution fosters inclusivity through its efforts to attract diverse students and organize activities that foster social connections between people from different backgrounds. The Sustainability Platform at the university focuses on achieving the primary objective of developing organizational equality dynamics alongside diversity and

inclusion and equity, and belonging practices. The Gender Equality Office utilizes this platform to showcase how the university supports human rights and social justice (Ozyegin University Live, 2024). The Community Engagement Projects (CEP) program enables students to participate in sustainable volunteer work, which enhances their social responsibility and environmental awareness (Ozyegin University Live 22, 2016).

The Çekmeköy campus features both arboretum areas and green roofs, which serve as relaxation spaces for students (Green Campus | ÖzÜ and Sustainability. The university maintains community safety and security as its top priority through its implementation of surveillance systems and access control points. The university's Environmental Policy outlines procedures for detecting and minimizing environmental threats to establish safe working conditions for staff and students.

Through its various initiatives, Özyeğin University shows dedicated support for social sustainability by integrating environmental care into its operational framework and educational programs, and physical facilities.

- **ISTANBUL TECHNICAL UNIVERSITY (ITU)**

Istanbul Technical University (ITU) is one of the world's oldest technical universities. Located in the Maslak district of Istanbul, ITU is a government-owned university established in 1773. It ranks 46th globally and is renowned for its engineering and architectural education. Over the centuries, ITU has developed a campus environment that harmoniously blends historical heritage with modern advancements, emphasizing sustainable development and enriching user experiences.

ITU Campus design and planning (Physical features)

The ITU campus design combines elements from historical urban planning approaches with modern urban planning principles. The university maintains various campuses, but the Ayazağa Campus in Maslak serves as its main location within Istanbul's business district. The strategic position of the campus enables students to reach academic and professional opportunities. The Campus unites contemporary architectural features with its original historical background (Yavuz & Altun, 2019). The campus zoning system organizes academic buildings with student housing and recreational facilities into separate zones to achieve functional efficiency and easy navigation (Gür, 2019).

Figure 2.17 ITU Ayazaga Campus master plan (Nehrumemorial.org)

The planning at ITU includes a core focus on creating a campus environment that supports pedestrian access. The institution makes bike lanes and green pathways, and open areas its main priorities because they support social interaction and mobility (Korkmaz & Akkurt, 2020). ITU implements sustainable campus planning through smart campus technology by using automated waste management systems and energy-efficient buildings, and intelligent mobility options (Göksel, 2020).

ITU Social Sustainability features

The ITU focuses on social sustainability because it understands the need to develop an inclusive and supportive campus community. The institution has developed inclusive policies that promote international student exchange programs, accessibility for students with disabilities, and gender equality (Karadayı & Yıldız, 2021). The social venues that foster a feeling of community among students and staff include cultural centers, student lounges, and collaborative study rooms (Dincer, 2018).

Figure 2.18 ITU Library (www.architectmagazine.com)

The ITU implements sustainability practices that extend beyond environmental concerns to include social and economic elements. The institution supports student entrepreneurship through its Technopark innovation hub, which provides resources to companies and fosters industry-academia partnerships (Gür, 2019). The organization strengthens its social responsibility image through its public seminars and outreach programs that benefit local communities (Yavuz & Altun, 2019). The campus features multiple cultural institutions together with recreational facilities that support diverse student interests. The campus hosts regular sporting competitions and concerts, and exhibitions, which create a lively atmosphere while providing students with extracurricular activities that support their academic development.

- **YEDITEPE UNIVERSITY**

Yeditepe University was established as a non-profit private institution through the Istanbul Education and Culture Foundation (İSTEK Vakfı) in 1996 and stands among Turkey's top foundation universities (Wikipedia Contributors, 2025). The main campus of Yeditepe University operates from the 26 Ağustos Campus, which takes up a substantial area on Istanbul's Asian side. The campus design unites modern facilities with Seljuk-inspired architectural elements to establish a balanced academic environment, which includes student housing and recreational amenities, and landscaped green spaces. The 2024 UI GreenMetric World University Rankings placed Yeditepe University at position 90 due to its environmental sustainability efforts (UI GreenMetric, 2024).

Campus design and planning at Yeditepe University

The built environment of Yeditepe University covers 236,000 square meters, while open space occupies 125,000 square meters. The university infrastructure includes 319 classrooms, 22

large lecture theatres, 32 computer laboratories, and 74 discipline-specific laboratories that support diverse academic programs. The campus includes multipurpose conference halls and cinema facilities, and sports complexes, which support educational and extracurricular activities. The features demonstrate the university's focus on spatial flexibility and multifunctionality in its campus environment (Wikipedia Contributors, 2025)

Figure 2.19 Yeditepe University's Campus plan (uygulamalibilimler.yeditepe.edu.tr)

The campus design of Yeditepe University combines natural elements through its large green areas and arboretum, which serves both as a biodiversity sanctuary and educational platform. The sustainability principles direct the university's landscaping approach to reduce environmental effects from built structures.

The institution shows strong dedication to environmental sustainability. The institution runs a 1 MW rooftop solar energy system, which stands as the biggest solar installation in Istanbul, while it builds a 350 kW wind energy facility. The institution collects rainwater for irrigation needs and utilizes treated wastewater for various purposes. The university implements thorough recycling and composting programs to decrease waste output (Sustainability Initiatives | Sustainable Yeditepe, 2024). The university supports sustainable mobility through vehicle access restrictions and shuttle services, and a walking-friendly campus design, which together decrease carbon emissions and improve environmental quality (Sustainability Initiatives | Sustainable Yeditepe, 2024)

Social Sustainability features at Yeditepe University

The campus design of Yeditepe University demonstrates environmental integration through its large green spaces and dedicated arboretum. The arboretum serves two purposes by supporting biodiversity and providing educational resources for ecological and environmental studies. The university creates an inclusive atmosphere through its diverse student population and educational programs that promote cultural understanding and social interaction. The Consultation and Coordination Center for Students with Disabilities (CCOSD) works to eliminate barriers that could make it difficult for community members to access buildings and classrooms and offices and roads and transportation and information (Campus Setting and Infrastructure | Sustainable Yeditepe, 2024).

2.2.6 Comparison between the universities reviewed

The research compares six educational campuses to determine which architectural elements and design approaches best support social sustainability in educational settings. The comparative analysis will reveal the most successful design components and strategies that enhance social sustainability through community involvement and student-staff interaction, and a sense of community. The research aims to establish a complete understanding of architectural design applications for creating socially sustainable campuses, which other institutions can use as reference models.

Table 2: Comparison Matrix table

INSTITUTION	Nottingham Trent University (NTU)	University of Groningen	Taylor's University	Istanbul Technical University (ITU)	Özyeğin University (ÖZU)	Yeditepe University
OWNERSHIP STATUS	public	Public	Private	Public	Private	Private
UI GREEN METRIC RANKING GLOBALLY	2nd	3rd	79th	38th	82nd	90th
PHYSICAL CRITERIA Functionality and flexibility	✓	✓	✓	✓	✓	✓

Accessibility(Infrastructure)	✓	✓	✓	✓	✓	✓
Integration with nature	✓	✓	✓	✓	✓	✓
Connectivity and mobility Sustainability	✓	✓	✓	✓	✓	✓
Safety and security (Infrastructure)	✓	✓	✓	✓	✓	✓
Technological infrastructure.	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓
SOCIAL CRITERIA						
Inclusivity (cultural/social features)	✓	✓	✓	✓	✓	✓
Green spaces and mental health	✓	✓	✓	✓	✓	✓
Safety and security (social perception)	✓	✓	✓	✓	✓	✓
Technological experience(collaborative)	✓	✓	✓	✓	✓	✓

The comparison matrix table presents an evaluation of six universities that achieved top 100 positions in the UI GreenMetric World University Rankings between public and private

institutions. The institutions successfully meet all essential physical and social criteria needed to design sustainable campuses. The institutions demonstrate best practices through their unified approaches to functionality and accessibility and environmental stewardship and inclusivity, and student well-being. The institutional strategies present valuable information that Istanbul Okan University can use to enhance its sustainability performance and future global ranking positions.

This chapter demonstrates the essential link between campus design and social sustainability promotion in higher education institutions. The analysis demonstrates how physical infrastructure and social considerations work together to enhance student experience and institutional performance by evaluating various architectural and environmental strategies across different universities. The reviewed cases demonstrate that successful campus planning involves integrated green spaces and inclusive design and sustainable mobility systems, and collaborative environments. The research provides valuable insights about sustainable campus development best practices, which serve as a starting point to enhance the built environment at Istanbul Okan University. The following chapters will use these findings to evaluate Okan University's current campus state before developing sustainable university design strategies that meet global standards.

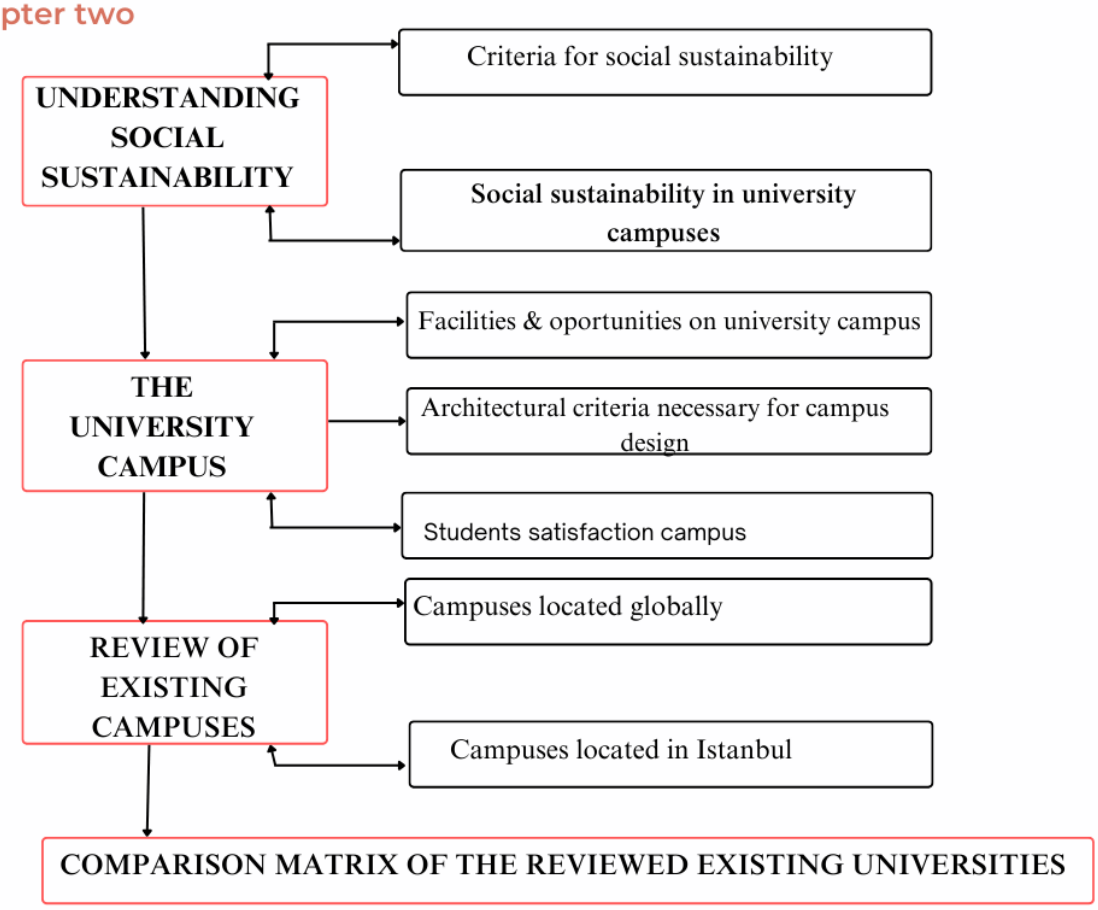

Figure 2.20 Chapter 2 flow chart (Researcher)

CHAPTER 3. CASE STUDY: EVALUATING THE BUILT ENVIRONMENT AT ISTANBUL OKAN UNIVERSITY

The built environment plays an essential role in determining student perceptions about their educational experiences in modern educational facilities. Educational facilities serve as social engagement spaces where students encounter cross-cultural learning opportunities while developing their identities. The physical arrangement of learning environments, together with their design choices and operational methods, directly affects student health and their sense of community and academic performance. The Istanbul Okan University case study provides an interesting lens to study the multifaceted relationship between design elements and sustainability, and student life quality. The built environment's impact on student social connections and cultural diversity promotion, and educational ecosystem health can be analyzed through an examination of physical infrastructure and social spaces, and cultural surroundings. The research aims to obtain practical knowledge that will direct future decisions about campus architecture and planning, and policy development to enhance the well-being of Istanbul Okan University students and staff.

3.1 Overview Of The Case Study

ISTANBUL OKAN UNIVERSITY (TUZLA CAMPUS)

Istanbul stands as the biggest Turkish city, which bridges Europe and Asia through its Bosphorus Strait division. Tuzla stands as a district on the Asian side of Istanbul, which occupies the southeastern part of the city and features industrial areas and rapidly expanding residential and commercial developments. The district of Tuzla presents an interesting combination of urban expansion with natural charm because it borders the Marmara Sea. Istanbul Okan University operates as a privately owned modern educational institution that demonstrates contemporary advancements in higher learning.

Okan University stands as an educational institution that represents modernity and innovation through its location in the dynamic city of Istanbul. There are two campuses of Okan University. The main campus is in the Tuzla neighborhood of Istanbul, Turkey. The majority of the university's faculties, including engineering, architecture and arts and sciences operate from the bigger Tuzla campus. And the Mecidiyeköy Campus, also called Akfırat. The university's Faculty of Medicine together with research institutions and vocational schools operate from the campus located in Mecidiyeköy district. The research will concentrate on the

Okan University Tuzla campus. The facility covers 160,000 square meters while hosting multiple research centers and application facilities (Architecture - Faculty of Art, Design and Architecture - İstanbul Okan Üniversitesi, 2023). The Tuzla Campus covers a vast area with contemporary academic facilities and student accommodations and recreational spaces and green zones. The university uses this campus as its central location for social activities and academic and research operations while its architectural design supports student well-being and participation (Yılmaz & Kaya, 2020).

3.1.1 Location of Okan University

The district of Tuzla, located on the southeast side of Istanbul, Turkey, is highlighted on the map below. Tuzla is a strategically important neighborhood on the Asian side of the city because it is close to Sabiha Gökçen International Airport and important transit arteries like the E-5 and TEM roads. The main campus of Istanbul Okan University is located in Tuzla, which benefits from the district's tranquil environment, open spaces, and accessibility.

Figure 3.1: Showing the map of Tuzla city in Istanbul (www.researchgate.net)

The main campus of Okan University, located in Tuzla (Tuzla campus) on the Asian side of Istanbul in the eastern part of the city, creates difficulties for students regarding transportation and accessibility. The distance between the urban core and the university limits how often students can participate in city-based activities and events, and opportunities. The restricted

ease of commuting creates social constraints because students mostly interact with each other within the university community. Students experience limited social development because they mostly interact with peers and acquaintances who are also part of the campus community. The university environment creates strong relationships among students, but it reduces their chances of experiencing the diverse social and cultural opportunities that cities usually provide. The restricted social environment may affect their capacity to network and participate in city-based extracurricular activities and integrate into broader societal contexts over time.

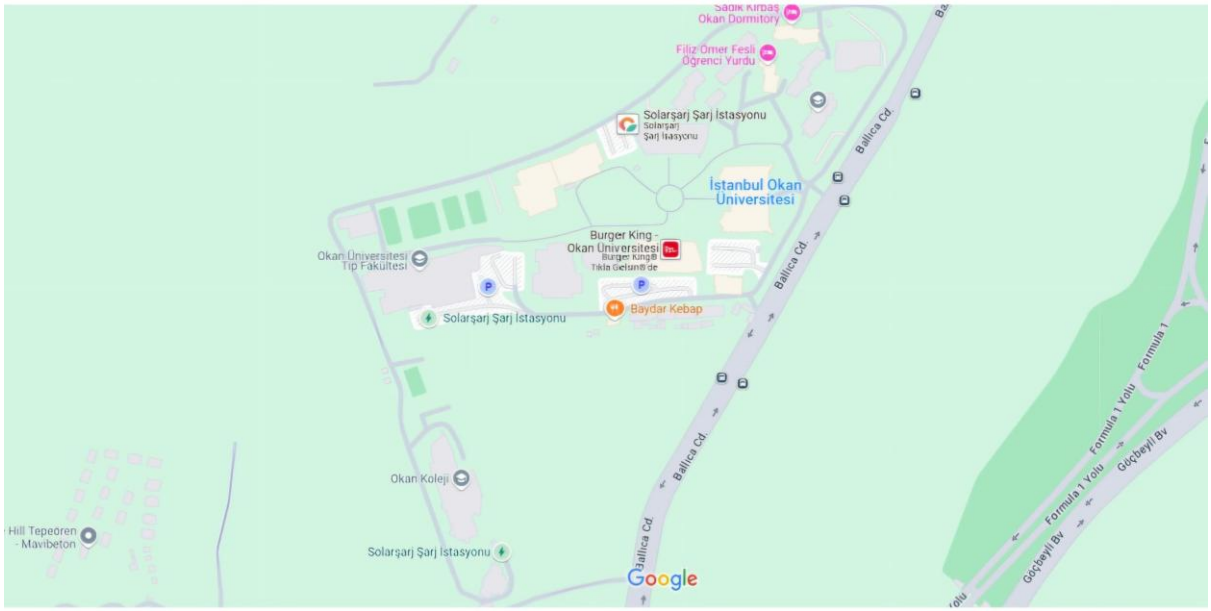

Figure 3.2 A map of Tuzla district showing the location of Okan University. (Google Earth.com)

The main campus aerial site plan in Figure 3.3 shows the current layout of buildings and parking areas, and road walkways. The site plan demonstrates a well-organized zoning approach that follows functional use principles. The dormitory buildings position themselves close to outdoor sports facilities to create an integrated student living and recreational space. Academic buildings occupy their own designated zone, which improves student access and academic participation. The campus features equal distribution of parking spaces, which provides users with easy access but reduces traffic congestion. The buildings connect through a network of pedestrian walkways and vehicular access routes, which enables smooth movement across the campus. The well-planned spatial organization creates an efficienuniversity environment that improves both operational efficiency and user

accessibility.

Figure 3.3 Aerial site plan of Okan University (Tuzla campus) (Researcher)

3.1.2 Accessibility to Okan University (Tuzla campus)

The university offers multiple transportation options, which improve accessibility and user convenience. The university campus connects to Istanbul's public transportation network through E-5 and TEM highways with direct bus and metro line services between major urban centers. The university provides on-site parking facilities for private vehicles, which combine with major arterial road access for vehicular movement. The university provides its own shuttle buses to serve major urban areas, which helps students commute more easily. The campus remains easily accessible through taxi services and ride-sharing platforms, which serve students with adaptable transportation requirements. The university demonstrates its dedication to urban integration through its multiple transportation options, which show careful attention to urban mobility and planning. The airport proximity of Sabiha Gökçen International Airport enables international students and visitors to reach the university easily (Okan University, n.d).

Figure 3.4 Accessibility to Okan University (www.okan.edu.tr)

Figure 3.5 Aerial view of part of Okan University showing green areas and parking lot, source: www.okan.edu.tr

3.2 Case Study Design Framework

The case study design examines Istanbul Okan University's built environment to determine its effects on students' social and cultural sustainability. The research will use observations together with surveys and semi-structured student interviews to evaluate how built

environment elements affect social interactions and cultural engagement and community building. The findings from this case study will enhance the discussion about sustainable campus design and its ability to create educational spaces that are inclusive and dynamic and culturally rich.

3.2.1 Navigating Campus Balance: Okan University's Physical And Social/Cultural Ecosystem

A university campus exists beyond its physical boundaries because it functions as an active ecosystem where different social interactions and cultural expressions unite. The physical environment of Okan University, together with its social dynamics and cultural activities, creates a vital foundation for the complete experience of students and staff members. The three dimensions must be understood as interconnected elements to develop a complete, thriving campus environment. The following chart demonstrates how physical elements of Okan University interact with social dynamics and cultural activities while showing their connectedness and reciprocal effects.

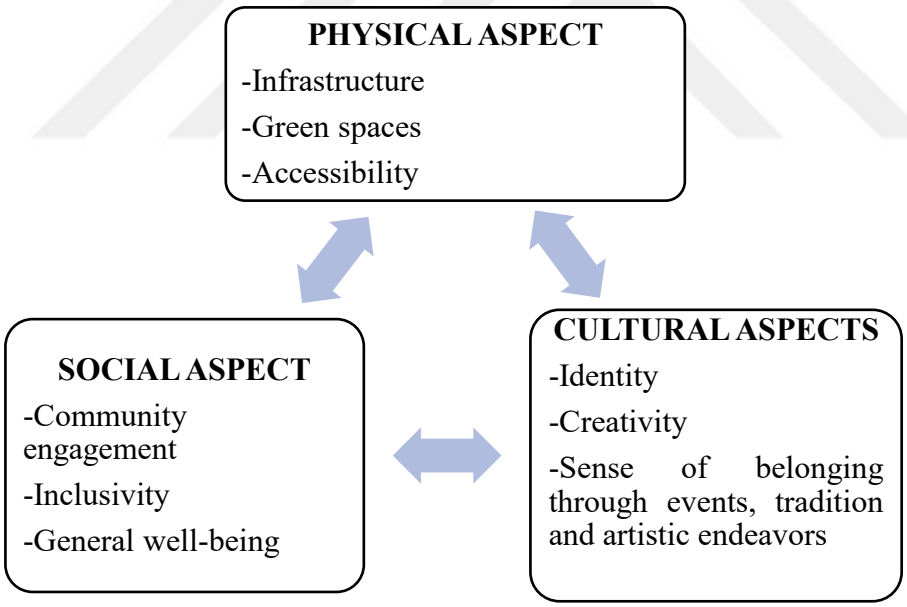

Figure 3.6: The relationship between physical, social, and cultural aspects in a university campus

In recent years, Istanbul Okan University has actively engaged in sustainable development initiatives, aligning its efforts with the United Nations' 17 Sustainable Development Goals (SDGs). These goals encompass a broad spectrum of global priorities, including eradicating poverty, achieving zero hunger, promoting good health and well-being, ensuring quality

education, advancing gender equality, and providing access to clean water and sanitation. Further objectives include affordable and clean energy, decent work and economic growth, industry innovation and infrastructure, reducing inequalities, fostering sustainable cities and communities, responsible consumption and production, climate action, conservation of life below water, life on land, and the promotion of peace, justice, and strong institutions. The 17th goal is the culmination of partnerships to support these goals.

Okan University has created platforms that encourage student and community engagement in sustainability practices, fostering awareness and cultivating responsible behavior towards environmental stewardship and social equity. These efforts not only support local and global development but also nurture a culture of sustainability among the academic community. The UN Türkiye works together with its local partners to implement these goals effectively and achieve them by the year 2030. These joint efforts aim to address the critical development challenges faced by Türkiye and the broader global population.

3.2.2 Physical aspect

The Okan University campus features multiple architectural styles, which unite contemporary buildings with environmentally friendly green areas to achieve ecological sustainability. The spatial organization creates pathways for pedestrians and communal areas, which promote both mobility and student interaction. The institution has become well-known because of its rapid growth alongside its continuous focus on academic success. The university's faculty expands and its facilities transform because student enrollment increases every year. The architectural choices made during this period directly influence the quality of life for staff members and students, and visitors of the university.

The illustration in Figure 3.6 shows the road network and building positions and parking areas of the Okan University Tuzla Campus. The designers created these elements to maximize both accessibility and safety, and mobility. The strategic placement of parking lots along with pedestrian-friendly areas and vehicle-free zones creates an enhanced overall campus experience. The strategic approach supports sustainability and social connection while

providing visitors and staff, and students with easy campus mobility.

Figure 3.7 Okan University road network, parking facilities, and building layout

Fig 3.7 (A)

Fig 3.7 (B)

Fig 3.7 (C)

The real-life image in Figure 3.7(A) shows the internal road network of Okan University campus which matches the area marked 'A' in Figure 3.7. The visual presentation follows the physical campus design criteria by showing accessibility and connectivity. The section labelled 'B' in Figure 3.7 appears in Figure 3.7 (B), and area 'C' is shown in Figure 3.7 (C) with designated seating areas for relaxation. The university demonstrates its commitment to nature integration through this feature, which shows how landscape elements create better user

comfort and environmental harmony in campus spaces.

Figure 3.8: Some faculty buildings on Okan campus Source:caseeducation.com

The university's infrastructure comprises various buildings such as academic buildings, laboratories, classrooms, faculty offices, administrative facilities, libraries, and student dormitories, all designed to support a wide range of academic disciplines. Thoughtfully integrated green spaces, including landscaped gardens and open areas for leisure time activities, offer serene environments for relaxation and recreation. The campus prioritizes accessibility, featuring barrier-free pathways, ramps, and elevators to ensure an inclusive experience for all students, including those with disabilities. The campus also features diverse recreational and social areas such as an amphitheater, as well as football, basketball, and volleyball courts.

3.2.3 Social /cultural Aspects

The Okan University campus design fosters inclusive collaboration by creating adaptable areas that serve both academic and recreational needs, as well as social purposes. The design promotes collaborative and informal engagement through open visibility of space activities from inside to outside, thus building an environment that supports active social interaction (Curtis, 2022). The design centers on creating a vibrant, inclusive community that fosters student well-being through its social engagement initiatives. The university bases its core value on inclusivity through its diverse student population and policies that promote equal access to resources and opportunities. It supports general well-being through its wide range of support services which include wellness programs and extracurricular activities, which improve the overall campus experience. Okan University demonstrates its dedication to building a supportive learning environment through its comprehensive approach to student life and community development.

The annual OkanFest, along with national holiday celebrations and numerous university events, strengthens campus community bonds while fostering student belonging. The campus supports artistic activities through regular theater shows and concerts, art exhibitions, and media projects that enable students to express themselves while working together. The various cultural elements combine to form an active, inclusive space that allows students to develop their talents and identities while feeling connected and inspired.

The campus safety perception remains strong because the university implements controlled entry systems for both walking and driving traffic. The university operates through a single main entry point, which the dedicated security team monitors to provide a protected space for all campus users.

Fig 3.7 (D)

Fig 3.7(E)

Figure 3.9 Okan University students socialising Source: www.okan.edu.tr

The enlarged view of area 'E' in Figure 3.7 shows the amphitheatre, which functions as a central space for student interaction through social and cultural events that support cultural exchange and communal identity reinforcement. The real-life representation of section 'D' in Figure 3.7

appears in Figure 3.7 (E) as the main campus entrance with a security checkpoint. The established security system creates a safe environment for students and staff while meeting the social sustainability requirements that educational campuses need to meet.

3.3 Survey Results And Analysis

The creation of sustainable architectural designs that focus on occupant needs requires a deep understanding of how built environments affect students. A thorough survey named "The Impact of the Built Environment on Students' Social and Cultural Sustainability in Educational Campuses: Istanbul Okan University" was implemented as part of this thesis.

The research evaluated how Istanbul Okan University's campus physical design and spatial features affect student social interactions and cultural engagement, and their overall well-being. The integration of survey data in this research provides essential knowledge to architectural design and deepens understanding about the built environment on human well-being in campus settings. The survey questions covered all relevant topics related to the study goal for better validity. The built environment's impact on social and cultural sustainability at Istanbul Okan University needed detailed question development to achieve accurate results.

The survey questionnaire, divided into two sections, contained questions about physical aspects and social/cultural aspects. The survey divided its questions into physical and social/cultural sections to enable better analysis and produce results that met the established evaluation criteria for built environment design.

3.4 Summary of Key Findings

The next section reveals the results, which demonstrate the effects of the built environment on social cohesion and cultural vibrancy in academic settings. The survey included 147 students from Istanbul Okan University who belonged to different nationalities and academic levels. The survey participants included 31.1% campus residents and 68.9% non-residential students who spent time at the campus. The student body consisted of 50.8% undergraduate students and 49.2% postgraduate students.

3.4.1 Physical Aspects

The section offers valuable information about student experiences with campus buildings and the visual effects of Okan University's architectural design. The survey included a section

where participants evaluated the physical design criteria of the campus environment. The questions in this segment were based on recognized principles of campus design and planning, focusing on aspects such as accessibility, functionality, integration with nature, safety, and technological infrastructure.

Table 3: Relationship between student experience, building usage, and visual impact of Okan University structure (researcher)

S/No	SURVEY QUESTION	STUDENTS RESPONSE
1	How often do you visit the Okan Campus?	• Daily – 60% • Weekly – 32% • Occasionally – 8%
2	How do you rate accessibility around the Okan campus?	• Good – 63.9% • Excellent – 26.4% • Fair – 19.7%
3	How functional do you find the learning and recreational facilities?	• Very Functional –22.8% • Functional – 41% • Somewhat functional - 36.2%
4	Do you feel Okan Campus is well integrated with nature?	• Strongly agree – 35.6% • Agree – 56.2% • Disagree – 8.2%
5	How would you describe the safety and security features of the physical environment?	• Highly secure – 20% • Inadequately safe – 35% • Minimally safe – 45%

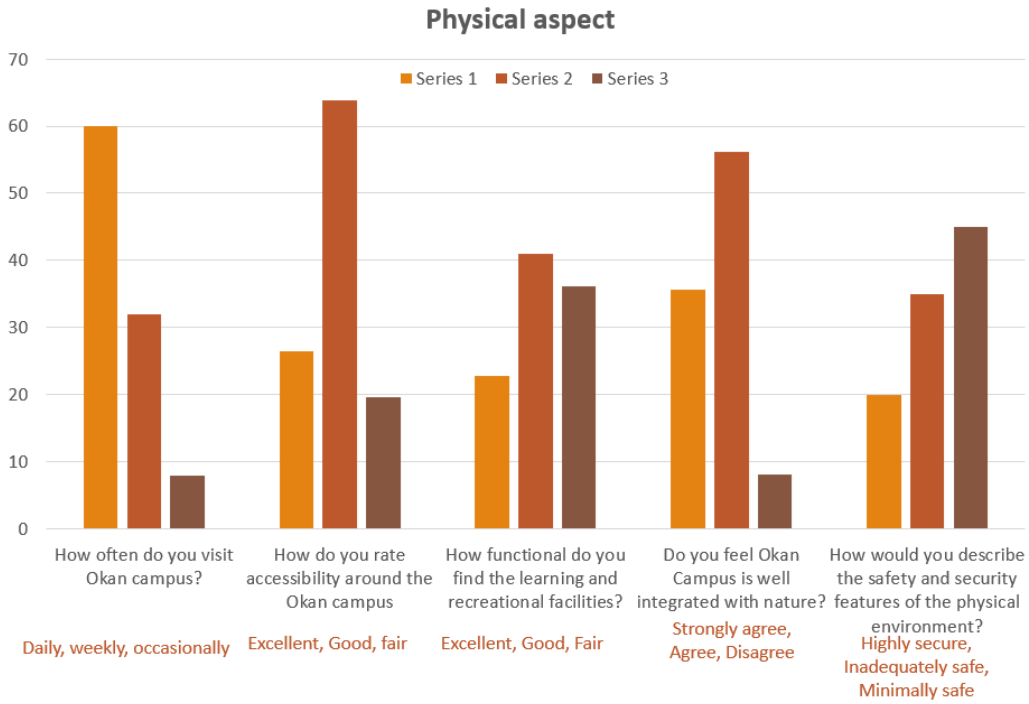

Figure 3.10 Survey results on physical aspects of students

Frequency of Visits: The study asked participants about their visitation frequency to Okan University. The responses were distributed daily, multiple times weekly, once a week, once a month, and rarely.

Accessibility on campus: The survey asked participants to rate accessibility levels across different areas of the campus. Most participants (63.9%) found the campus accessibility to be good, while 26.4% rated it excellent and 19.7% found it fair.

Integration with Nature: The survey asked participants to assess the integration of natural elements in their daily campus experience and how well the built environment blended with surrounding natural features. The survey results demonstrated that 35.6% of participants strongly agreed and 56.2% agreed, but 8.2% disagreed.

Safety and Security (Physical Perception): The survey asked participants to assess their campus safety during daytime and nighttime by evaluating physical security elements such as lighting and surveillance systems, and access control. The survey results indicated that 20% of participants rated the campus security as high, but 35.3% found it sufficient, and 44.7% believed the safety measures were insufficient.

Reason for your response to the safety question above: The open-ended question asked participants to explain their safety assessment. A follow-up question on campus safety. The inadequate nighttime illumination received widespread criticism from participants because it leads to diminished campus security. A substantial number of survey participants mentioned that the numerous dogs present on campus throughout the day and night cause them fear and discomfort, especially when the sun sets. The lack of adequate lighting and the abundance of dogs on campus were identified as primary factors that made people feel the campus was not safe during non-daylight periods.

3.4.2 Social/cultural Aspects

The survey included a section to understand how the physical environment influences social and cultural dynamics in educational campuses like Okan University. The following questions were asked to understand how the built environment affects social interaction and cultural experiences in the university setting. The following are their responses.

Table 4: Interplay between building design and socialization (researcher)

S/NO	SURVEY QUESTION	STUDENTS RESPONSE
1	Do you think the interaction facilities in Okan campus are sufficient?	• Adequate – 52.9% • Inadequate – 47.1%
2	What type of area do you prefer for socialization?	• Indoor – 29.6% • Outdoor – 70.4%
3	How does the Okan campus environment contribute to your mental health and emotional well-being?	• Moderately positive – 11.5% • Very positive – 85.5%
4	How safe and secure do you feel on campus in terms of social perception?	• Safe – 35% • Somewhat safe – 65%
5	Does the Okan campus provide adequate collaborative spaces or a platform for students' interaction?	• Disagree – 40% • Agree – 60%

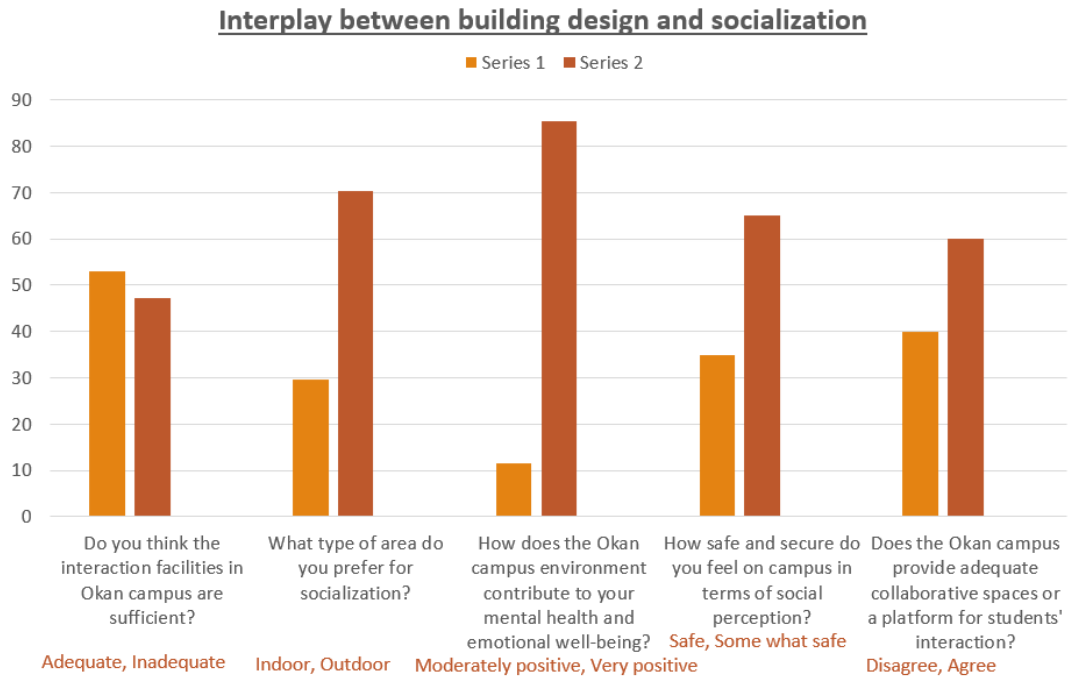

Figure 3.11 Survey Results on Social Aspects of Students

Safety on campus (Social perception): The assessment of campus social safety (Social perception) involved asking participants about their campus social safety perceptions. The results showed that 35% of the respondents reported feeling very safe in social settings, while the remaining 65% indicated that they felt somewhat safe.

Campus plan design and Mood and mental health: The participants were asked if they thought the design of the campus could influence a person's mood. Only 11.5% of respondents stated that the plan of the campus built environment had no impact on a person's mood, while 85.5% of respondents said that it did.

Preferred Areas for Social Interactions: The respondents indicated the types of spaces that they would like to use for social interaction (e.g. cozy corners, communal lounges, outdoor seating). 29.6% of the respondents prefer indoor spaces for social interactions, compared to 70.4% who prefer outdoor settings.

Sufficiency of Interaction Facilities at Okan Campus: Their opinions on the adequacy of interaction facilities within Okan University (such as student lounges and outdoor seating) were sought. The question received several answers. The Okan campus's interaction facilities are deemed adequate by 52.9% of respondents, inadequate by 47.1% of respondents.

Promotion of Social Interactions: Participants reflected on whether the overall environment at Okan University actively promotes social interactions. Of the respondents, 85.2% think that the atmosphere at Okan University fosters social contact, while 14.8% disagree.

Alternative Social Interaction Environments: If they answered negatively, we asked them to describe the type of environment they believe fosters social interaction. The majority of the 14.8% of respondents who believe that the atmosphere at Okan University does not foster social contact suggest there should be more outdoor social spaces that bring people together.

The survey results reveal that design features of buildings have a significant impact on social interaction at Okan University. An overwhelming 91.8% of respondents stated that building design improves interaction efficiency, and 85.5% stated that it also affects mood. The most preferred setting for social interaction is the outdoor area, with 70.4% of the respondents choosing it over the indoor area. 62.3% of the respondents feel that the interaction facilities are adequate, while 31.1% of the respondents do not agree and think that there is a lack of indoor or outdoor seating alone.

The majority of students (85.2%) agree that the campus environment promotes social interaction; however, the 14.8% who disagree suggest that there should be more inclusive outdoor social spaces. These insights highlight the necessity for well-planned campus design in promoting social interaction on campus. Alternative Social Interaction Environments: We asked the students to describe the kind of environment they think would foster social interaction if they replied negatively. The majority of the 14.8% of respondents who think the atmosphere at Okan University does not foster social contact suggest that there should be more outdoor social spaces that bring people together.

The survey findings show how architecture impacts social dynamics at Okan University. More than nine in ten (91.8%) of respondents believe that building design improves interaction efficiency, and 85.5% believe it also affects mood. The preferred area for socialization is outdoor space, as 70.4% of students choose this over indoor locations. The current interaction facilities are deemed adequate by 62.3% of respondents, and 31.1% believe they lack sufficient seating both indoors and outdoors. Most students (85.2%) agree that the campus environment promotes social interactions; however, the 14.8% who disagree advocate for more inclusive outdoor social spaces. Thoughtful campus design stands out as a key factor that influences social well-being, according to these findings.

Table 5: How Okan University's Built Environment shapes Cultural Interaction and Enriches Students' experience (researcher)

S/NO	SURVEY QUESTION	STUDENT RESPONSE
1	Do you think cultural interaction can be influenced by the built environment?	• Yes – 88.5% • No – 11.5%
2	Do you find the built environment in Okan to be different from that seen on other campuses?	• Yes – 75.4% • No – 24.6%
3	Have you interacted with people from other cultures while on the Okan campus?	• Yes – 95.1% • No – 4.9%
4	Do you think the Okan campus has cultural elements that improve inclusivity?	• Yes – 34.4% • No – 65.6%
5	Do you think the university should have more cultural elements to represent its diversity?	• Yes – 96.7% • No – 3.3%

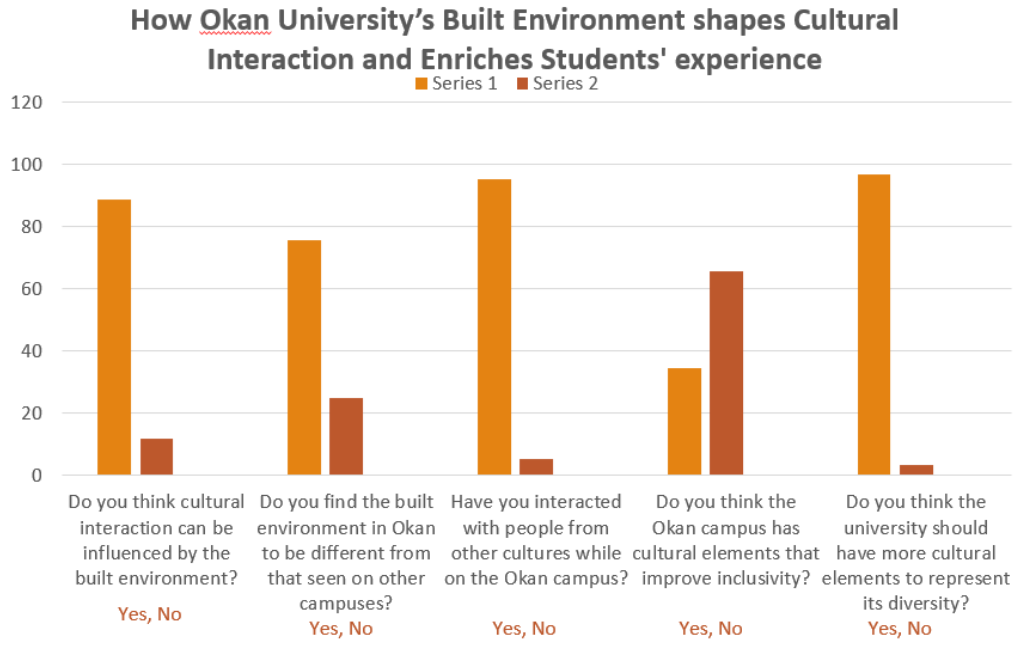

Figure 3.12 Survey results on cultural aspects of students

The distinctiveness of Okan University's Built Environment: The respondents were asked if they think that the architectural designs at Okan University are distinct from the ones they have seen on other campuses. This was done to try and establish the unique visual identity of the

university. Of the participants, 75.4% think that the built environment at Okan University is quite different from the ones they have seen on other campuses, while only 24.6% disagree.

Cross-Cultural Interactions: Respondents were asked whether they had encountered students from different cultural backgrounds at Okan University. This highlights the campus's role as a melting pot of cultures. 95.1% of the respondents have had contact with people of different cultures during their stay at Okan University, and the rest of the respondents disagree.

The impact of built environments on cultural interactions: To what extent, if any, do the respondents think that the physical design of the buildings affects cultural interactions? This connects the dots between the built environment and the social environment. Of those surveyed, 88.5% of the respondents felt that the built environment has an impact on cultural exchange, and 11.4% did not agree.

Cultural elements that support diversity and inclusion: Participants were asked whether the built environment at Okan University includes cultural elements that support diversity. These elements could help foster a sense of belonging among all the participants. Based on the respondents, 34.6% of them agreed that Okan University's built environment includes cultural elements that promote diversity, while 65.6% disagreed.

Advocacy for More Cultural Representation: Participants were asked if they felt it important to integrate more cultural elements in order to better represent the diversity of the university. This emphasizes the significance of cultural representation in the design of the buildings. 96.7% of the participants agree, and 3.3% disagree.

Respect for Cultural Practices: Participants were asked to what extent they think the campus environment is respectful and inclusive of different cultural practices. This indicates the extent to which the university is welcoming and non-discriminatory. 77% of respondents agreed that the campus environment is respectful and inclusive of different cultural customs, while 23% disagreed.

This study provides evidence on how the built environment of Okan University influences cultural interactions and the quality of the student experience. A large proportion of the participants (75.4%) identified the campus architecture as different and thus unique in appearance. A large majority of 95.1% of respondents reported that they have interacted with people from different cultures during their time at the university. Most participants (88.5%) felt that architecture affects the cultural exchanges, while only 34.6% of them felt that the

campus has cultural elements that enhance diversity. However, 96.7% of the respondents supported the inclusion of more cultural elements to better reflect the university's diversity. Also, 77% of the respondents agreed that the campus is respectful and accommodating of different cultures, which is in line with the concept of inclusion.

3.5.3 Connection to Campus

The survey concludes by investigating how Okan University's architectural design affects students' emotional connections and their perceptions of the campus environment. The analysis investigates how the visual characteristics of the built campus environment influence student recommendations and their feelings of connection to the space. The evaluation of these factors reveals how design aesthetics creates conditions for pride and identity development and student engagement. The survey investigates both functional and emotional aspects of built environments to understand how architectural elements enhance campus belonging and total student experience.

Recommendation Based on Campus Facade: The participants evaluated their willingness to suggest Okan University to others through their observations of the campus facade. The visual appearance of architectural design finds its expression in this assessment. The campus façade would not lead 62.3% of respondents to recommend Okan University to others, but 37.7% would make such a suggestion.

Emotional Connection to the Campus: The survey asked participants to assess their emotional attachment to the campus environment. The emotional connection between students and their campus environment directly affects their overall experience.

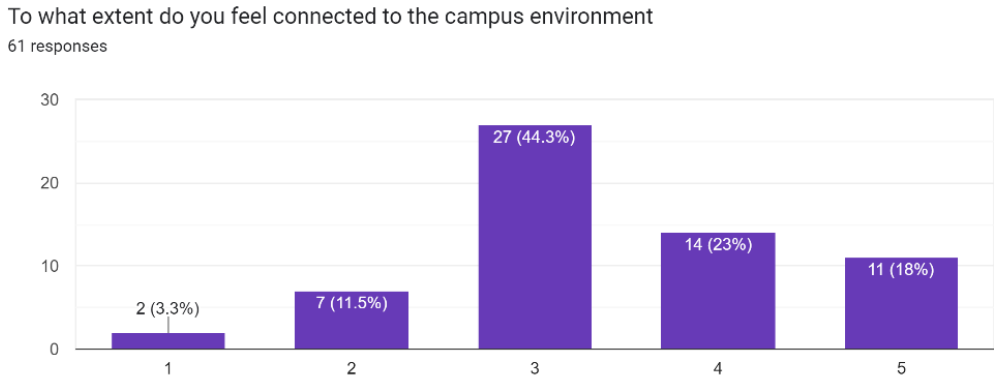

Figure 3.13 Connection to campus

3.5 Evaluation Of The Results

The survey results from Istanbul Okan University demonstrate that the constructed environment directly influences how students experience their physical health and social relationships, and cultural development. The majority of students found the campus easy to navigate while appreciating its natural integration, but they expressed safety concerns because of insufficient lighting and free-roaming dogs. The architectural design of the campus creates positive effects on mood and social interaction, while outdoor areas remain the preferred location for socializing. The majority of students rated their social safety as high while believing the campus fosters social interaction, yet some students requested better seating areas inside and outside. The survey results showed that students regularly interact with people from different cultures, and they believe that architectural design helps create spaces for such interactions. Many students felt that cultural elements were insufficiently represented in the campus architecture while expressing strong support for increased cultural inclusion. The campus design stands out to students but few would choose the university only because of its visual appearance which indicates that emotional and cultural aspects matter more in the complete campus experience.

Table 6: Student Insights on Okan University Campus Usage and Experience

Campus Feature	Observation	Student Feedback
Lecture Halls	Primary use	Reflect on academic priorities
Recreational Facilities	Widely used	Important for leisure & interaction
Hostels	Used by 31.1%	Key for residential life
Architectural Design	Positive influence	Improves social interaction & mood
Outdoor Spaces	Preferred for socializing	Seen as more engaging
Interaction Spaces (e.g., seating)	Some dissatisfaction	Needs improvement

Physical criteria met	**Good**	**Very good**	**Excellent**
• Functionality and flexibility			
• Accessibility (Infrastructure)		✓ .	
• Integration with nature			✓ .
• Sustainability		✓ .	
• Connectivity and mobility	✓ .		
• Safety and security (Infrastructure)	✓ .		
• Technological infrastructure	✓ .		
• S			
Social criteria met			
• Inclusivity (Cultural/social features)	✓ .		
• Green spaces and mental health			✓ .
• Safety and security	✓ .		
• Technological experience (collaborative)	✓ .		

The survey results from Istanbul Okan University students validate all alternative hypotheses presented in this research. It demonstrates that built environment design elements create substantial connections between students during their time on campus. Students used well-designed spaces, including open lounges and collaborative areas, and well-lit corridors to increase their opportunities for meaningful social interactions. The results confirm that the

alternative hypothesis (H_1) demonstrates that intentional design elements improve student social connections.

The analysis of Hypothesis 2 demonstrated that the architectural design of the campus plays a major role in creating cultural diversity and inclusivity. The study found that multipurpose halls and inclusive common areas serve as effective spaces for intercultural gatherings, which promote cultural exchange and create a sense of belonging among diverse student groups. The results validate the alternative hypothesis (H_1) by demonstrating that inclusive architectural designs create culturally diverse environments.

The data from Hypothesis 3 demonstrated that students' perceptions about their built environment directly influence their social and cultural well-being during their time on campus. Students expressed that attractive and useful spaces created positive effects on their comfort levels and their engagement and cultural development. The findings validate the alternative hypothesis (H_1) by showing that student perceptions directly affect their campus-wide well-being.

The results of Hypothesis 4 demonstrate that existing campus design approaches lead to better social interaction and cultural sustainability between students. The campus community benefits from three main elements, which include pedestrian-friendly layouts, green spaces, and adaptable learning environments that create a socially dynamic and culturally sustainable environment.

Table 7: Summary Of Survey Results Supporting Research Hypothesis

Hypothesis	Key Finding	Student Response/Observation	Conclusion
H_1: Built environment influences social interaction	Well-designed spaces (lounges, collaborative zones, corridors)	Encouraged meaningful social interaction	H_1 supported
H_2: Campus layout promotes cultural diversity and inclusivity	Spaces for intercultural gatherings (e.g., multipurpose halls)	Promoted cultural exchange and belonging	H_1 supported
H_3: Perception of the built environment impacts well-being	Functional, aesthetically pleasing spaces	Enhanced comfort, engagement, and enrichment	H_1 supported
H_4: Campus design supports social and cultural sustainability	Functional, aesthetically pleasing spaces	Enhanced comfort, engagement, and enrichment	H_1 supported

The research methodology and case study approach used to evaluate students' social and cultural sustainability at Istanbul Okan University's Tuzla Campus appear in Chapter 3. The research used a mixed-methods approach, which combined architectural campus analysis with student survey data. The architectural analysis from the previous chapter helped identify essential physical and socio-cultural design criteria that shaped both survey question structure and content. The initial research enabled the survey to be divided into physical and social/cultural sections for better evaluation of campus environment effects on student experiences.

The chapter delivers a detailed description of the case study site by explaining its geographical position and transportation accessibility. The case study design framework examined the equilibrium between physical infrastructure and social/cultural dynamics by explaining how campus spaces promote student engagement and inclusivity and facilitate interaction. The survey data underwent systematic presentation and analysis, which produced findings that were grouped into physical aspects and social/cultural aspects, and emotional connection to campus. The final section evaluates these findings while stressing the importance of integrated design for creating socially and culturally responsive educational environments.

Chapter Three

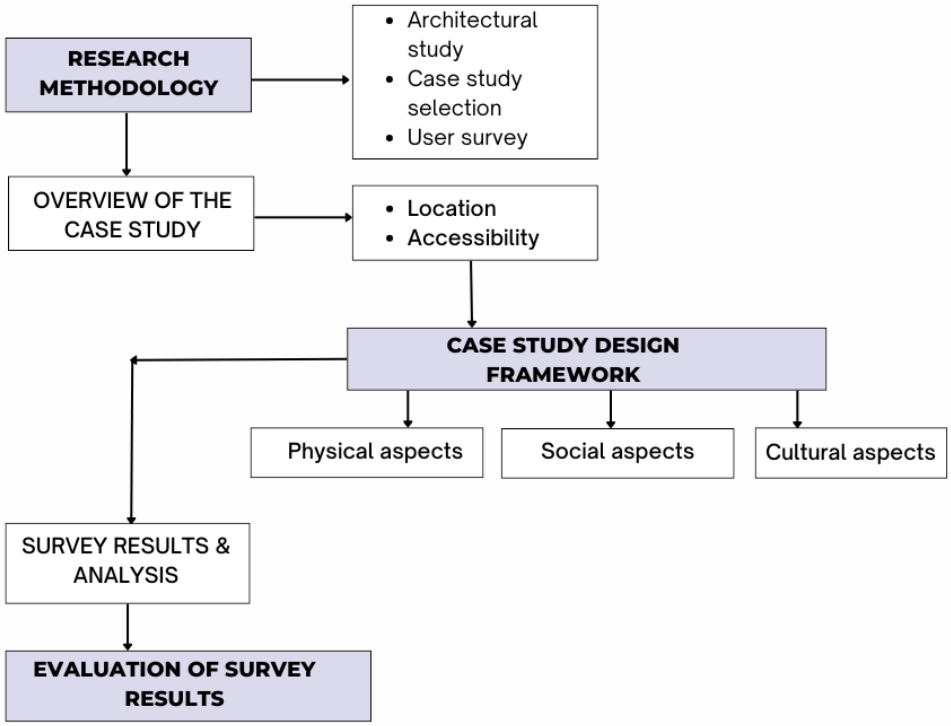

Figure 3.14 Chapter 3 Flow chart (Researcher)

CHAPTER 4. CONCLUSION AND RECOMMENDATIONS

This research concludes by presenting the essential findings and evaluation results of Istanbul Okan University's (Tuzla) Campus in this chapter. The chapter functions as an integration of findings that connects theoretical concepts to practical implementation while showing how different elements of the study advance knowledge about culturally responsive campus design. The chapter transforms intricate observations into straightforward actionable insights that guide institutions to improve their campus quality of life and student engagement.

University campuses exist beyond their physical structure because they create active settings where academic activities meet cultural differences and social interactions. Okan University demonstrates good performance regarding accessibility and openness and physical functionality, yet shows significant shortcomings in cultural inclusivity and social stimulation. Okan University's contemporary built environment focuses on practicality instead of identity, which results in neglecting some aspects of cultural diversity elements that could create stronger student connections and feelings of belonging.

4.1 Conclusion

The study aimed to investigate the impact of built environment factors on students' social and cultural sustainability through an analysis of Istanbul Okan University as its case study. The research used architectural analysis and student survey data to show how physical space structures the daily routines and cultural integration, and social relationships of university students.

Findings from the survey show that students at Okan University mainly stay in lecture halls and hostels, and recreational facilities, yet these areas do not generate the complete emotional connection needed for deep social interactions. The efforts toward accessibility and natural integration have advanced, but students mentioned the scarcity of culturally specific and social interaction spaces as major drawbacks to their university experience. Students reported that inadequate lighting, insufficient inclusive gathering areas, and a culturally uninspired built environment create essential problems that reduce their comfort and security during night hours.

The study demonstrates that university design needs to transcend its functional and visual aspects in order to integrate social and cultural components. The study uses both literature research and comparative analyses of international and local university campuses to show that educational environments with intentional cultural symbolism and inclusive public spaces and strategic spatial planning produce stronger student social bonds and emotional well-being with enhanced community feelings.

In the case of Okan University, the results show that there is a need for a built environment that represents different cultures better, alongside improved outdoor social spaces and enhanced physical security elements such as proper lighting and easy-to-navigate pathways. The university can achieve a dynamic, inclusive learning environment by implementing these changes in its built space.

Ultimately, this research proves that the physical environment functions as a transformative force that promotes cultural education alongside social development and sustainability. It provides practical recommendations for Okan University and other educational institutions to create learning environments where academic achievement meets cultural diversity and social welfare can thrive together.

Key findings and conclusions on the built environment and student sustainability at Okan University

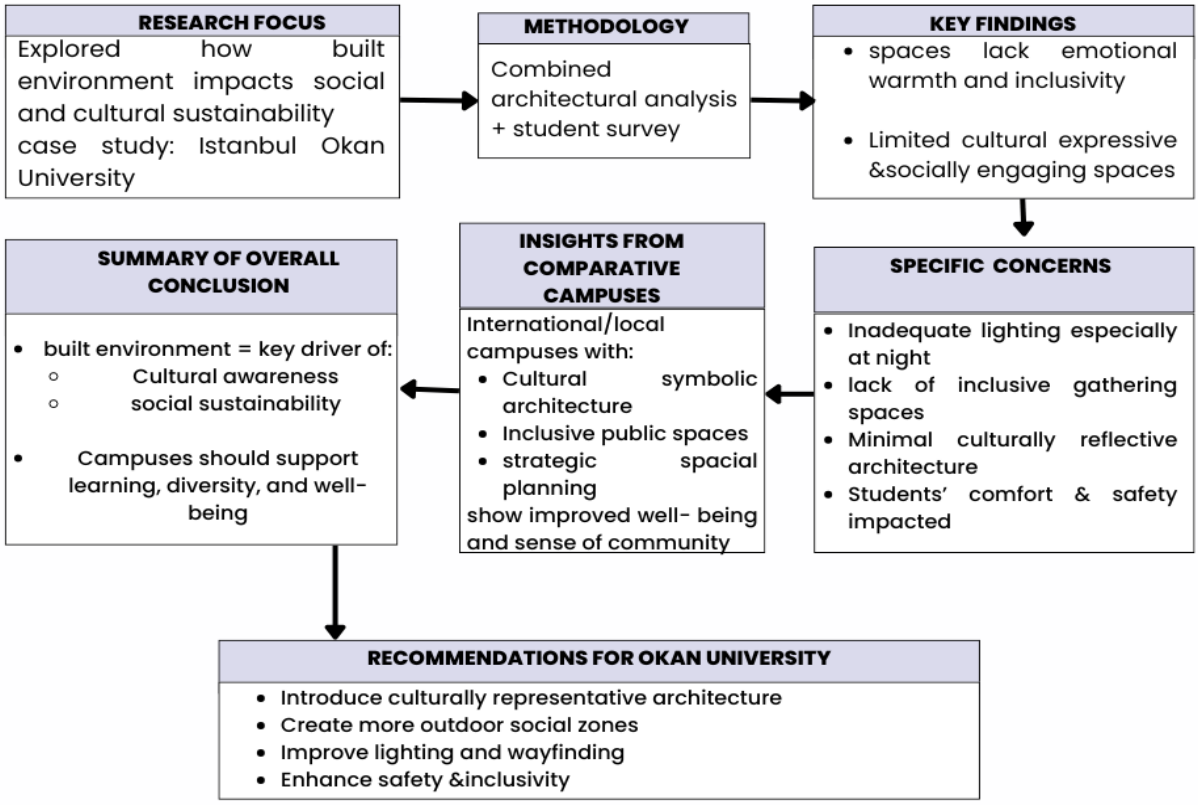

Figure 4.1 Flow chart: Key findings and conclusions on the built environment and Okan student sustainability

4.2 Recommendations

The research on educational buildings, combined with scholarly reviews and student surveys at Okan University, led to the following recommendations for improving student experience. The recommendations fall under two main categories, which include Physical Criteria and Social/Cultural Criteria.

Table 8: summary of recommendations

Physical Criteria	Recommendations
Enhance Accessibility and Navigation	Ensure that all campus areas, including recreational and academic buildings, are easily accessible to students with diverse mobility needs. Improved signage, pedestrian-friendly pathways, and barrier-free designs should be incorporated across the campus.
Strengthen Safety Infrastructure	Install adequate lighting, especially along pathways, parking lots, and secluded areas, to improve safety after dark. Implement more visible surveillance systems and marked emergency points to enhance students' sense of security.
Increase Integration with Nature	Expand green spaces, shaded seating areas, and landscaped courtyards to foster a connection with nature and provide students with calming environments for relaxation, study, and social interaction.
Upgrade Technological Infrastructure	Ensure that all key spaces are equipped with updated technology (e.g., Wi-Fi, smart boards, charging stations), making them more functional for both academic and social purposes.

Consider Building Orientation and Spatial Flow	Reevaluate the orientation of major facilities (hostels, lecture halls, cafeterias) to improve flow, reduce congestion, and promote intuitive movement across campus zones.

social/cultural criteria recommendations

Create Inclusive Social Interaction Zones	Design more open-air gathering spots, such as outdoor lounges, amphitheaters, and informal seating clusters that encourage spontaneous social engagement. Prioritize comfort, accessibility, and climate-appropriate design.
Incorporate Cultural Symbols And Artworks	Embed diverse cultural motifs, sculptures, murals, and design features that reflect the identities of the student population. These elements foster a sense of belonging and cultural pride among students from varied backgrounds.
Provide Multi-Functional Community Spaces	Develop flexible-use indoor facilities like student lounges, makerspaces, and community rooms that can be adapted for cultural events, group study, or club activities.
Promote Cross-Cultural Engagement Opportunities	Integrate architectural spaces that support intercultural dialogue, such as multicultural centers or themed cultural gardens, which can host festivals, exhibitions, and other inclusive programs.

Foster A Sense Of Belonging Through Emotional Design	Emphasize warm, welcoming architectural styles and layouts that positively influence mood. Use color schemes, furniture design, and spatial arrangements that promote comfort and emotional connection to the campus.

The implementation of these recommendations will transform Okan University's built environment into a socially enriching and culturally inclusive space. The campus will better support academic success, personal development, and community well-being when design strategies align with students' needs and experiences.

4.3 Recommendations for Future Research

Future research should expand this study by investigating additional aspects of campus design and student social and cultural sustainability. Research involving multiple universities from different cultural and climatic, and geographic regions would enable generalization of findings to show how regional differences affect spatial needs and social dynamics. Longitudinal research that monitors how built environment modifications impact student behavior and social engagement throughout time would provide a better understanding of causal relationships. The analysis would gain depth by including administrative staff and alumni perspectives, which would create a complete understanding of campus life. The evaluation of campus zones' spatial connectivity, accessibility, and usage patterns would benefit from advanced spatial analysis tools, including GIS and simulation modeling. Future research should investigate how digital and hybrid learning environments transform student spatial and social expectations after the pandemic.

CHAPTER FOUR

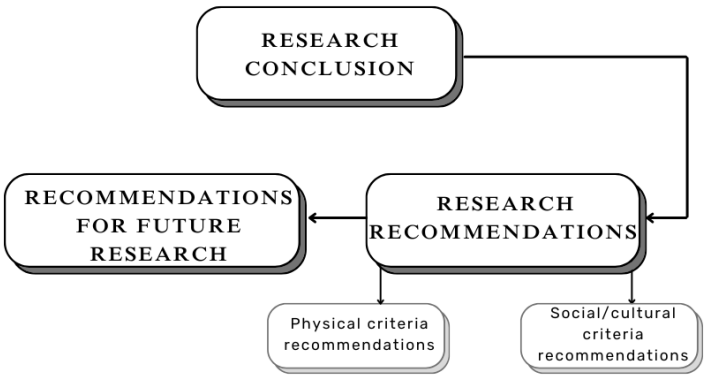

Figure 4.2 Chapter 4 flow chart (Researcher)

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APPENDICE

Appendix A: Survey Questionnaire

THE IMPACT OF THE PHYSICAL ENVIRONMENT OF A CAMPUS DESIGN REFERING TO SOCIAL SUSTAINABILITY IN UNIVERSITY CAMPUSES: ISTANBUL OKAN UNIVERSITY CASE

SOCIODEMOGRAPHICS

* Indicates required question

Tick all that apply.

1. Nationality *
   - □ North America
   - □ South America
   - □ Eropean
   - □ Asian
   - □ Australian
   - □ Africa

2. Education level *
   - □ Undergraduate
   - □ Post-graduate

3. Address *
   - □ On-campus
   - □ Off-campus

FAMILIARITY WITH OKAN UNIVERSITY

This section explores your experience with the physical aspects of Okan University's campus design and how they influence your daily activities.

4. How often do you visit Okan University? *
   - □ Daily
   - □ Multiple times a week
   - □ Once a week

- □ Once a month
- □ Rarely

5. How would you rate the accessibility and connectivity of different parts of the campus, including pedestrian-friendly pathways and ease of movement between key facilities such as lecture halls, the library, and the cafeteria? *
    - □ Excellent
    - □ Good
    - □ Fair

6. How functional and flexible do you find the learning and recreational spaces (e.g., classrooms, lounges, study zones)? *
    - □ Very functional and adaptable
    - □ Somewhat functional
    - □ Not very functional
    - □ Not functional at all

7. Do you feel that the campus is well integrated with nature (e.g., green spaces, landscaping, nature views)? *
    - □ Strongly agree
    - □ Agree
    - □ Disagree

8. How would you describe the safety and security features of the physical environment (e.g., lighting, surveillance, controlled access)? *
    - □ Very safe and secure
    - □ Adequately safe
    - □ Minimally safe

BUILDING DESIGN: SOCIAL AND CULTURAL INTERACTION

This section focuses on your social and cultural experiences on campus and how the environment supports them.

9. Do you think the interaction facilities of Okan campus are sufficient? (e.g Student lounges, outdoor seating)?*
    - □ Yes
    - □ No

10. What type of areas do you prefer for social interactions? *
    - □ Indoor
    - □ outdoor

11. How does the campus environment contribute to your mental health and emotional well- being (e.g., through access to green spaces, relaxation areas)? *
    - □ Very positively
    - □ Moderately positively

12. How safe and secure do you feel on campus in terms of social perception (e.g., interactions with peers, campus culture)? *
    - □ Very safe
    - □ Somewhat safe

13. Does the campus provide adequate collaborative spaces or platforms for student interaction, group work, or innovation? *
    - □ Agree
    - □ Disagree

14. Do you think cultural interactions can be influenced by built environments? *
    - □ Yes
    - □ No

15. Do you find the built environment designs in Okan University to be very different from those seen on other campuses? *
    - □ Yes
    - □ No

16. Have you interacted with people from other cultures while at okan university? *
    - □ Yes
    - □ No

17. Do you think Okan University's built environment has cultural elements that

Improve inclusivity? *

- □ Yes
- □ No

18. Do you think the university should have more cultural elements to represent its diversity? *

- □ Yes
- □ No

19. To what extent do you feel connected to the campus environment

- □ 1
- □ 2
- □ 3
- □ 4
- □ 5