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# The Impact of the Built Environment on Students' Social and Cultural Sustainability in Educational Campuses: Istanbul Okan University Case

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## Abstract

It is common knowledge that well-functioning buildings improve our lives, communities, and culture. This paper describes the intricate relationship between architecture, spatial design, and the sustainable well-being of educational institutions. How physical spaces impact social interactions, foster cultural exchange, and contribute to long-term sustainability is explored. Social sustainability, which aims to define, organize, and develop social life based on humans and their relationships/interactions in social life, requires a versatile and well-understood relationship between the built environment and society. By combining qualitative research, user surveys, and architectural analysis, this paper provides actionable insights for enhancing the social and cultural sustainability of educational campuses. It is extremely important to evaluate the spatial quality of the built environment in terms of students' sense of belonging, social ties, sense of community, trust, and physical well-being when using university campuses for students coming from different cultures, different cities/countries, and different professions. This study, which will focus on Istanbul Okan University Campus as a case study, will propose an original evaluation framework that relates the functional quality of the campus's-built environment to various spatial qualities at different spatial levels for evaluating social sustainability in campus life.

**Keywords:** University Campuses; Social Sustainability; Quality of life.

## 1. Introduction

In the context of educational institutions, the built environment surpasses mere physical constructions and assumes a dynamic role that shapes the fundamental aspects of student life. The architectural decisions that are incorporated into these areas have a significant impact on how students move through the corridors, gather in common areas, and interact with their surroundings. In the words of Winston Churchill, "We shape our buildings, and our buildings shape us afterward." (Winston Churchill, 1943). All structures must be planned, constructed, maintained, and modified to accommodate societal needs. They must create settings that enable the purpose for which they are built while individuals live and work productively, promoting the growth of social and professional networks (Amen & Nia, 2020; Aziz Amen, 2022 ; Auwalu & Bello, 2023; Gaha, 2023)

. Social sustainability is a multidimensional concept that includes health, social, economic, and environmental elements necessary for urban growth

The impact of the built environment extends far beyond aesthetics. It reverberates through the social fabric, cultural understanding, and sustainable behaviors of students. Every architectural decision whether in the layout of dormitories, the design of classrooms, or the arrangement of outdoor areas holds significance. These choices mold students' interactions, foster cross-cultural awareness, and contribute to the long-term well-being of both individuals and the collective. Socially and publicly accountable architecture has become increasingly popular as sustainability is emphasized. Due to its connection to the general public, this has led to public architecture playing a more important role than before (Domique, 2002). Public architecture is a subset of socially and publicly accountable architecture that focuses on designing buildings and spaces that are accessible and beneficial to the general public. Public architecture plays a more important role than before because it reflects and shapes the identity, culture, and democracy of a society. It also has the potential to address some of the most pressing challenges of our time, such as climate change, social injustice, crime prevention, and cultural diversity.

This paper aims to clarify the complex relationship that exists between spatial design, architecture, and the long-term viability of educational facilities. The analysis closely examines Istanbul Okan University, examining how physical spaces influence social dynamics, cross-cultural interactions, and the campus's lasting legacy. The paper also contributes to a comprehensive understanding of the interplay between architecture, community, and lasting impact. It is a call to architects, educators, and policymakers alike a reminder that the built environment is not static but a living canvas upon which student experiences are painted. By nurturing vibrant, inclusive spaces, students are empowered to thrive, connect, and leave an indelible mark on the fabric of their educational journey.

The design of a built environment influences the social behavior and interactions of the people who use it (L Volker, 2011). A school building for instance houses classrooms, libraries, labs, auditoriums, cafeterias, playgrounds, and sports facilities and can have an impact on the socializing, learning outcomes, and overall well-being of the school community.

## 2. Materials and Methods

Sustainable construction involves More than just the structure of the built environment. The most significant instrument for building a sustainable society is probably provided by urban design (Bovill Carl, 2015). The built environment is crucial in shaping students' social and cultural experiences within educational campuses. As urbanization intensifies and educational institutions expand, understanding how architectural design, spatial layout, and programming impact student well-being and social interaction becomes crucial.

The primary aim of this paper is to investigate and understand how the built environment within educational campuses influences the social and cultural sustainability of students, it will also address the following research questions;

- **Social Interaction:** How does the built environment influence student social interaction? What are the key elements within the campus that foster or hinder meaningful connections among students?
- **Cultural Sustainability:** To what extent does the physical environment contribute to cultural sustainability? How can design interventions enhance cultural exchange, appreciation, and preservation?
- **Student Preferences:** What preferences do students have regarding campus spaces and façade? How do these preferences align with the existing built environment, and where are the gaps?

This research also aims to bridge the gap between architectural theory and practice by emphasizing the importance of intentional design in educational settings using a case study approach. By identifying opportunities for enhancing social connectedness, cultural exchange, and overall student well-being, more sustainable and vibrant campus environments can be created. The findings will inform future campus planning, design guidelines, and policy decisions.

Review of existing literature, investigating some existing educational campuses, and a user survey of some Okan university students would be carried out during this research By employing this mixed-methods approach, it aims to comprehensively explore the intricate relationship between the built environment, social interactions, and cultural sustainability within educational campuses, 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.

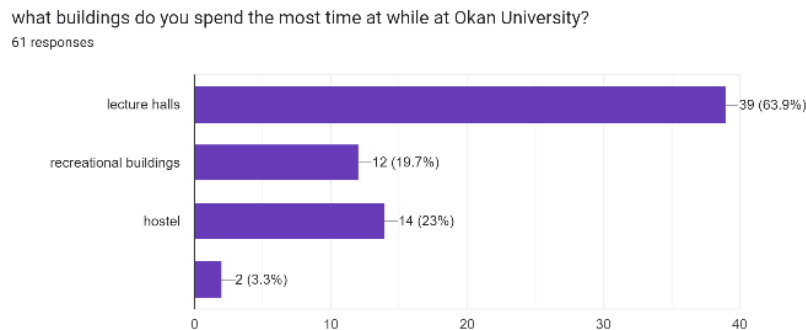
## 3. Results

The architectural environment greatly impacts students' interactions, experiences, and overall campus well-being. This research explores two important areas: The perception of the use of façade materials of the campus buildings on the students and how the physical arrangement affects student behavior. It is hoped to clarify how architectural design decisions might support students' social and cultural sustainability by looking at these important components. As part of this research, a comprehensive survey titled "The Impact of The Built Environment on Student's Social and Cultural Sustainability in Educational Campuses: Istanbul Okan University" was conducted and the Participants responded to questions related to their perceptions of facade materials, comfort levels, and aesthetic preferences. This survey aimed to explore occupants' perceptions, experiences, and preferences related to the materials used in the facades of Okan University buildings. To collect data, an online questionnaire was designed specifically tailored to address the research objectives. The questionnaire included both closed-ended (quantitative) and open-ended (qualitative) questions. Closed-ended questions allowed for standardized responses, while open-ended questions encouraged participants to provide detailed insights. The survey included 61 Okan University students of different nationalities and educational levels. Of the 61 respondents, 31.1% reside on campus, while the remaining 68.9% visit the campus occasionally. 49.2% of the respondents were postgraduate students and 50.8% were undergraduates. To provide insights on valuable context for understanding the relationship between student experiences, building usage, and the visual impact of Okan University's facades. As part of the survey, respondents were asked about their familiarity with the facades of Okan University buildings. Specifically, the following aspects were explored:

**Frequency of Visits:** Participants were queried about how often they visit Okan University. The responses were distributed daily, multiple times weekly, once a week, once a month, and rarely.

**Preferred Buildings:** Respondents identified the buildings where they spend the most time while on campus. 63.9% selected lecture halls, 19.7% selected recreational buildings, hostel was chosen by 23% and the remaining 3.3 % selected other as their preferred building.

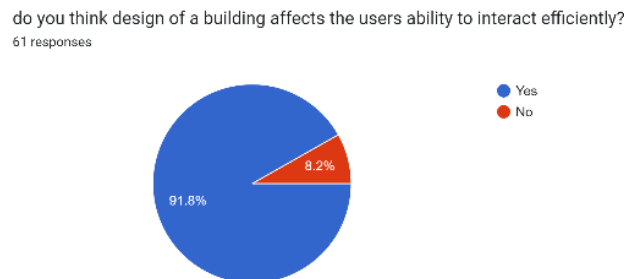
Reasons for Building Selection: participants were asked to state why they chose to spend time in the specific buildings they mentioned in the previous question. This was an open-ended question, so different people gave varied answers. Some named lectures, while others cited tutorials, study, relaxation, and group discussions. The remaining people claimed that the campus served as their home, thus they were constantly moving about the campus.



To provide a context for understanding how architectural design shapes social dynamics within educational campuses like Okan University, the interplay between building design and social interaction was explored in this segment of the survey. Participants were asked a series of thought-provoking questions:

Impact of Building Design on Interaction Efficiency: it was inquired whether they believe that a building's design influences users' ability to interact efficiently. Of the respondents, 91.8% were in favor, with the remaining 8.2% believing that a building's design has no bearing on how well its users can interact.

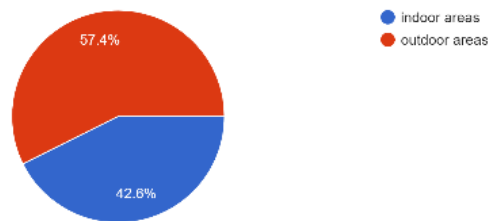
Building Design and Mood: Participants shared their perspectives on whether the design of a building can affect an individual's mood. While 11.5% of respondents said a building's design had no bearing on a person's mood, 85.5% of respondents said it can.



Preferred Areas for Social Interactions: Respondents specified the types of spaces they prefer for social interactions (e.g., cozy corners, communal lounges, outdoor seating). 42.6% of the respondents prefer indoor spaces for social interactions, compared to 57.4% 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 62.3% of respondents, inadequate by 31.1% of respondents, while the remaining 6.6% is distributed among the respondents, who believe that either the indoor or outdoor seating areas are insufficient alone.

what type of areas do you prefer for social interactions  
61 responses



**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. Of the 14.8% of respondents who believe that the atmosphere at Okan University does not foster social contact, the majority suggest there should be more outdoor social spaces that bring people together.

To get insights on a comprehensive understanding of how Okan University’s built environment shapes cultural interactions and enriches the student experience, the final segment of the survey, explored the intricate relationship between building design and cultural interactions at Okan University. Participants responded to the following questions:

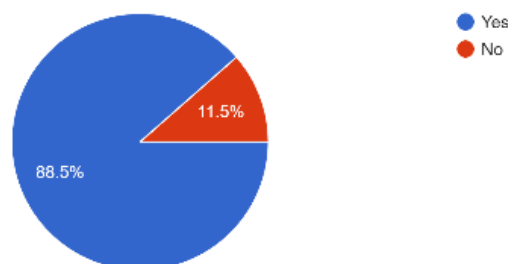
**The distinctiveness of Okan University’s Built Environment:** It was inquired whether participants perceived the architectural designs at Okan University as markedly different from those observed on other campuses. This question was asked to shed more light on the university’s unique visual identity. Of those surveyed, 75.4% believe that Okan University's built environment designs are significantly different from those of other campuses, while just 24.6% disagree.

**Cross-Cultural Interactions:** Participants shared whether they have engaged with individuals from diverse cultural backgrounds while at Okan University. This highlights the campus’s role as a melting pot of cultures. 95.1% of respondents say they have interacted with people from different cultures while attending Okan University, but the remainder of respondents disagree.

**Impact of Built Environments on Cultural Interactions:** It was explored whether respondents believe that the physical design of buildings can influence cultural interactions. This bridges the gap between architecture and social dynamics. Of those surveyed, 88.5% believed that built surroundings had an impact on cultural exchanges, whereas 11.4% held the other view.

**Cultural Elements Enhancing Inclusivity:** Participants reflected on whether Okan University’s built environment incorporates cultural elements that foster inclusivity. These elements may promote a sense of belonging for all. According to respondents, 65.6% believe that Okan University's built environment incorporates cultural features that enhance diversity, while 34.4% disagree.

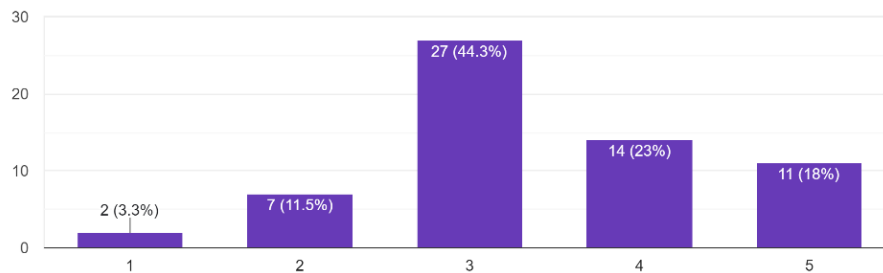
Do you think cultural interactions can be influenced by built environments?  
61 responses



**Advocacy for More Cultural Representation:** participants Were asked whether they feel that the university should integrate additional cultural elements to better represent its diversity. This underscores the importance of cultural representation in architectural choices. Of those who think the university should represent its diversity with additional cultural components, 96.7% agree and 3.3% disagree.

Emotional Connection to the Campus: Respondents rated the extent to which they feel connected to the campus environment. This emotional bond influences their overall experience.

To what extent do you feel connected to the campus environment  
61 responses



Respect for Cultural Practices: Participants shared their perceptions regarding whether the campus environment respects and accommodates various cultural practices. This speaks to the university's openness and acceptance. While 23% disagree, 77% of respondents believe that the campus environment respects and accommodates various cultural customs.

Recommendation Based on Campus Facade: Finally, the participants explored whether they would recommend Okan University to others based on their impressions of the campus facade. This encapsulates the visual impact of architectural design. Based just on the campus façade, 62.3% of respondents indicated they would not suggest Okan University to anyone, while 37.7% said they would.

The architectural intricacies of Okan University, the primary case study were examined. its façade materials were meticulously investigated, highlighting their benefits in terms of aesthetics, energy efficiency, and sustainability. Furthermore, a comparative analysis was conducted, comparing Okan University with some other existing educational campuses. By comparing different universities and the building materials utilized, it aims to identify how the built environment impacts social and cultural sustainability. This comparative design increases the depth of the results and makes it possible to conclude a variety of instances. In this study, the façade of three existing buildings at Okan University (the rektörlük, the student's dormitory, and the Yaşam Merkezi (social center)) will be examined. The facade of Okan University exemplifies a thoughtful blend of modernity, functionality, and sustainability (Architecture - Faculty of Art, Design and Architecture - İstanbul Okan Üniversitesi, 2023)

By analyzing the materials used in the selected buildings, more insights into how educational buildings can balance aesthetics, performance, and environmental responsibility will be gained. The buildings are made of the following materials:

- **Glass Curtain Wall:** The Yaşam Merkezi and rektörlük building facade incorporates large expanses of glass, allowing natural light to flood the interior spaces. Glass curtain walls are prevalent in contemporary educational buildings due to their transparency, visual appeal, and daylight penetration. The use of high-performance, double-glazed glass panels enhances energy efficiency by minimizing heat transfer.
- **Aluminium Cladding:** Some parts of the Yaşam Merkezi façade feature aluminum cladding in various colors and finishes. Aluminum panels provide durability, weather resistance, and design flexibility.
- **Ceramic Tiles:** The rektörlük building façade combines terracotta panels with glass, creating a harmonious blend of materials. Terracotta provides thermal insulation and contributes to the building's overall energy performance.
- **Stone Veneer:** Okan University made use of stone veneer for accent walls on specific sections. Natural stone veneer adds a timeless and elegant touch to the façade.
- **Metal Mesh Screens:** Okan University's façade incorporated metal mesh screens to control sunlight, enhance privacy, and create visual interest. The metal mesh screens serve both functional and decorative purposes.
- **Concrete:** Concrete makes up the façade of the student dormitories at Okan University. Concrete is highly durable and can withstand the test of time. It resists weathering, impacts, and wear, making it ideal for high-traffic areas like dormitories.

#### Benefits of Materials Used in the Selected Buildings' Façade

**Glass:** The use of high-performance, double-glazed glass panels enhances energy efficiency by minimizing heat transfer (Steiner & Veel, 2011)

**Aluminum Cladding:** Aluminum panels provide durability, weather resistance, and design flexibility. The lightweight nature of aluminum allows for ease of installation and maintenance (Chemello et al., 2019).

**Ceramic tiles:** The use of ceramic tile facades has several benefits, including weather protection, sustainability, low maintenance, versatility in design, durability and longevity, and aesthetic appeal (García-Moreno, 2016).

**Stone Veneer:** Natural stone veneer adds a timeless and elegant touch to the façade. Stone provides durability and requires minimal upkeep (Sweller et al., 1998).

**Metal Mesh Screens:** Metal mesh screens serve both functional and decorative purposes. They can be customized in terms of pattern and density (García-Moreno, 2016).

**Concrete:** Concrete façades have several benefits, including low maintenance requirements, fire resistance, thermal insulation, noise reduction, durability and longevity, and design versatility (Sweller et al., 1998).

### **Impacts the Selected Buildings' Façade Materials Have on Students' Social and Cultural Sustainability**

In this study, the façade of three existing buildings at Okan University (the rektörlük, the student's dormitory, and the Yaşam Merkezi (social center)) were examined. They contained the following materials: concrete, glass, ceramic tiles, aluminum cladding, stone veneer, and metal mesh screen. The following impacts of the construction materials can be Based on the user experiences collected through surveys, the following observations were made:

**Table 1:** Impact of Okan façade materials on students

| <b>GLASS</b>  |  |
|---|--|
| Glass facades influence social interactions, environmental sustainability, and cultural inclusivity within educational campuses. It balances aesthetics, functionality, and energy efficiency which is essential for creating a harmonious and sustainable built environment (Steiner & Veel, 2011) |  |
| Aesthetic Impact  | <ul style="list-style-type: none"> <li>- Glass façade provides abundant natural light but may lead to glare during certain hours. A visually appealing campus enhances students' pride and sense of belonging</li> <li>- Glass facades contribute to the overall architectural aesthetics of the campus. They often symbolize modernity, openness, and progress</li> <li>- University buildings with glass facades often appear dynamic and forward-thinking.</li> <li>- The use of high-performance, double-glazed glass panels enhances energy efficiency by minimizing heat transfer</li> </ul> |
| Thermal Comfort   | <ul style="list-style-type: none"> <li>- Glass is a poor insulator, leading to heat gain in warmer climates and heat loss in colder climates.</li> <li>-Excessive heat can impact student comfort, energy consumption, and the need for air conditioning.</li> </ul>   |
| Acoustic Comfort  | <ul style="list-style-type: none"> <li>- Glass is a poor sound insulator compared to other building materials like concrete or brick</li> <li>-Single-pane glass allows sound to easily pass through, which can be problematic in noisy environments</li> </ul>  |
| Psychological Well-being  | <ul style="list-style-type: none"> <li>-Abundant natural light through glass facades positively affects mood and well-being.</li> <li>-Sunlight exposure can enhance concentration and reduce stress levels among students</li> </ul>  |
| Environmental impact  | <ul style="list-style-type: none"> <li>- Glass facades affect energy efficiency. Cooling systems required to counteract heat consume more energy and contribute to global warming.</li> <li>- Sustainable design strategies are crucial to mitigate these environmental effects.</li> </ul>  |
| Cultural Representation   | <ul style="list-style-type: none"> <li>-Glass facades can be designed to incorporate cultural elements, reflecting the university's diversity and inclusivity.</li> <li>-Thoughtful integration of cultural symbols or patterns promotes a sense of identity and respect for different backgrounds.</li> </ul>   |
| <b>CERAMIC TILES</b>  |  |
| Ceramic tiles are both aesthetically pleasing and useful, which enhance students' social and cultural experiences within educational campuses (García-Moreno, 2016).  |  |
| Aesthetic Impact  | -Ceramic tile facades enhance the visual appeal of buildings.  |

|                          |   |
|--------------------------|---|
|                          | -Whether in solid colors, patterns, or textured finishes, they add character and charm  |
| Thermal Comfort          | -Ceramic tiles provide excellent thermal insulation, helping regulate indoor temperatures.  |
| Acoustic Comfort         | -They contribute to soundproofing, reducing noise transmission from outside.  |
| Psychological Well-being | -Ceramic tile façade can create a visually appealing environment which can positively impact students' mood and reduce stress                                       |
| <b>EFFECTS ON USERS</b>  | -Ceramic tile facades can contribute to a positive and stress-reducing environment for students by combining aesthetics, sustainability, comfort, and customization |

### CONCRETE

Concrete façade materials have an aesthetic, practical, and sustainable impact on students' social and cultural experiences (Sweller et al., 1998).

|                          |  |
|--------------------------|--|
| Aesthetic Impact         | -Concrete facades can be strikingly beautiful when designed thoughtfully   |
| Thermal Comfort          | -Concrete structures help stabilize internal temperatures.<br>-They keep buildings cooler in hot weather and contribute to energy efficiency.              |
| Acoustic Comfort         | -Concrete provides some sound insulation, reducing external noise penetration.<br>-It helps stabilize indoor temperatures, indirectly affecting acoustics. |
| Psychological Well-being | -Well-designed concrete facades contribute to a positive learning atmosphere.  |
| <b>EFFECTS ON USERS</b>  | -Building users benefit from a durable, visually pleasing, and comfortable environment   |

### ALUMINUM

Aluminum cladding impacts student experiences by enhancing aesthetics, energy efficiency, and cultural representation, contributing to a socially and culturally sustainable campus environment (Chemello et al., 2019).

|                          |   |
|--------------------------|---|
| Aesthetic Impact         | -Aluminum cladding gives buildings a sleek, contemporary appearance.<br>-Modern aesthetics can positively influence students' perception of their environment and foster a sense of pride.<br>-Aluminum cladding often incorporates glass elements or perforations. This transparency allows students to see beyond the facade, connecting them visually with the surroundings and promoting interaction.<br>-Lightweight and continuous, aluminum casings enhance the aesthetic of educational buildings, giving life to unique buildings with great visual impact.<br>- Well-designed aluminum facades enhance the overall aesthetics of university buildings |
| Thermal Comfort          | -Aluminum cladding helps maintain internal comfort by minimizing temperature fluctuations.<br>-It contributes to energy efficiency and reduces air conditioning expenses.<br>- Aluminum cladding provides an additional layer of insulation. Improved energy efficiency reduces heating and cooling costs, benefiting both students and the environment.  |
| Acoustic Comfort         | -While aluminum itself is not a strong sound insulator, properly designed systems can enhance acoustic performance by minimizing noise penetration  |
| Psychological Well-being | - Aluminum cladding often incorporates glass elements or perforations. This transparency allows students to see beyond the facade,  |



|                         |   |
|-------------------------|---|
|                         | connecting them visually with the surroundings and promoting interaction.   |
| Environmental Impact    | <ul style="list-style-type: none"> <li>- Aluminum is recyclable and has a smaller ecological footprint.</li> <li>- Choosing sustainable materials aligns with campus sustainability goals.</li> <li>- Properly insulated aluminum cladding helps maintain consistent indoor temperatures this makes Students benefit from a comfortable learning environment, especially during extreme weather conditions</li> </ul> |
| Cultural Representation | <ul style="list-style-type: none"> <li>- Aluminum cladding can be customized with patterns, colors, or cultural symbols.</li> <li>- Thoughtful design choices can celebrate diversity and inclusivity, enhancing cultural sustainability.</li> </ul>  |

In educational campuses, various façade materials have distinct effects on students' social and cultural sustainability. As observed in Table 1 above, the façade materials used in some selected buildings in Okan University have a variety of impacts on its students. Glass façade for example influence social interactions, environmental sustainability, and cultural inclusivity within educational campuses. It balances aesthetics, functionality, and energy efficiency which is essential for creating a harmonious and sustainable built environment. Ceramic tiles are both aesthetically pleasing and useful, which enhance students' social and cultural experiences within educational campuses. Concrete façade materials have an aesthetic, practical, and sustainable impact on students' social and cultural experiences. Aluminum cladding impacts student experiences by enhancing aesthetics, energy efficiency, and cultural representation, contributing to a socially and culturally sustainable campus environment.

### Table 2: Comparison Matrix

In this comparative study, the architectural design of various educational facilities, including the primary case study Okan University is examined. By comparing Okan University with other selected campuses, it is aimed to uncover patterns, contrasts, and best practices related to building design, social dynamics, and cultural sustainability. Through this multidimensional exploration, a valuable insight into the diverse approaches taken by educational institutions worldwide is gained, ultimately informing the understanding of effective campus environments.

| Name of Institution                                  | Materials and construction  | Environmental sustainability   | Social space interaction and cultural representation   | Accessibility and connectivity  | Natural environment integration   | Overall students experience   |
|--|---|--|--|---|---|---|
| SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN (SUTD) | <ul style="list-style-type: none"> <li>-Precast concrete</li> <li>-Glass</li> <li>-Aluminum composite material</li> </ul> | <ul style="list-style-type: none"> <li>-Green experimental ground. The campus serves as an experimental ground for testing sustainable technologies</li> </ul> | <ul style="list-style-type: none"> <li>- common lounge</li> <li>-collaborative studios</li> <li>-Outdoor plazas</li> <li>- The campus hosts workshops and experiences that bridge cultural boundaries.</li> <li>- Its curriculum and events celebrate technology, design, and</li> </ul> | <ul style="list-style-type: none"> <li>- SUTD's campus ensures barrier-free access to classrooms, labs, and common areas.</li> <li>-Universal restrooms cater to diverse needs.</li> <li>-SUTD focuses on technology-driven design and innovation.</li> </ul> | <ul style="list-style-type: none"> <li>- SUTD's campus incorporates facade planters, green roof terraces, and sky gardens which enhance natural environment integration and provide green spaces for students.</li> <li>- The campus design considers resilience</li> </ul> | <ul style="list-style-type: none"> <li>- SUTD provides a dynamic learning environment with a focus on technology and solutions.</li> <li>-Students engage in research, AI, and design-driven projects, preparing them for impactful careers.</li> <li>-its interdisciplinary</li> </ul> |



|                                      |   |  |   |  |   |  |
|--------------------------------------|---|--|---|--|---|--|
|                                      |   |  | innovation from a global perspective.   | -Availability of State-of-the-art labs, research centers, and digital infrastructure   | against climate change-related hazards.   | ry curriculum integrates design, innovation, and entrepreneurs hip   |
| GREEN SCHOOL INDONESIA               | -Bamboo<br>-Native Grass<br>-Customary mud walls                      | - Campus relies on micro-hydropower and solar panels for energy<br>- Bamboo used in its construction which is a renewable and eco-friendly material<br>- sustainable curriculum that integrates sustainability education and environmental awareness | -Open courtyard<br>-Bamboo pavilion<br>-Outdoor classrooms<br><br>-The use of bamboo in construction reflects Balinese architectural traditions and sustainable practices.<br>-Its curriculum integrates environmental awareness and cultural appreciation. | - The school's bamboo structures consider wheelchair access and ease of movement.<br>-Pathways are level and well-maintained.  | - The school's campus design integrates with the lush natural surroundings.<br>- It extensively uses bamboo, a renewable and eco-friendly material which blends harmoniously with the lush Balinese landscape.<br>- Its open courtyards, bamboo pavilions, and outdoor classrooms immerse students in natural surroundings. | - Its Students experience education in a wall-less, nature-immersed campus.<br>-The bamboo structures, open courtyards, and outdoor classrooms create a unique and inspiring atmosphere.<br>-The school focuses on sustainability, innovation, and design-thinking which prepares students for a changing world. |
| BAHRIYE ÜÇÖK ECOLOGICAL KINDERGARTEN | -Glass Fiber Reinforced Concrete (GFRC)<br>-Steel-concrete frameworks | - Skylights and Green roof<br>- Winter Garden space which enhances the indoor environment<br><br>- Environmentally friendly materials for building and furniture.<br>-permaculture areas available   | -Outdoor playground<br>-Communal garden<br>-seating nooks<br><br>- it draws inspiration from origami forms, reflecting cultural creativity and aesthetics.<br>- The design considers the needs of young children, creating an inclusive environment         | - Availability of Ramps, wide corridors, and tactile cues facilitate movement.<br>-play equipment accommodate s children with physical challenges present.<br><br>- the kindergarten incorporates age-appropriate technology for educational purposes. | - The kindergarten emphasizes connectivity with nature through its ecological design.<br>-Green spaces, gardens, and outdoor learning areas facilitate interaction with the natural environment.<br>- The basement floor houses less light-intensive areas such as  | - Its students benefit from a holistic learning environment that integrates nature, sustainability, and creativity.<br>-The central green playground and winter garden provide unique spaces for exploration and play.<br>-Children engage with the natural environment,   |

|                          |   |   |   |   |  |   |
|--------------------------|---|---|---|---|--|---|
|                          |   |   | for diverse abilities.  |   | sleeping rooms, labs, and multipurpose rooms   | fostering curiosity and a love for learning.<br>-Its design encourages sensory experiences and hands-on activities.   |
| ISTANBUL OKAN UNIVERSITY | -Ceramic Tiles<br>-Concrete<br>-Aluminum cladding | -Availability of photovoltaic panels on rooftops<br>-Zero waste approach which promotes sustainable production and consumption habits | -Café and restaurants<br>- Amphitheaters<br>-Music studios and game room<br>- celebrates cultural diversity through its student body, which comprises over 35 different nationalities.<br>- The campus promotes inclusivity by integrating global perspectives and cultural exchange. | - It prioritizes accessible pathways, ramps, and elevators.<br>-Restrooms and common areas comply with universal design standards.<br>- It prioritizes digital connectivity within its campus.<br>- Availability of Smart classrooms, e-learning platforms, and digital libraries | - Okan University's campus design responds to the natural landscape of Istanbul.<br>- The campus achieved the Green Mark (Platinum) certification, emphasizing environmental sustainability. | - Students benefit from affiliations with national and international companies, gaining extensive practical experience.<br>-The campus offers a vibrant student life with amenities such as cafes, restaurants, fitness facilities, and entertainment centers.<br>-It encourages psychological support services and personal development seminars |

In Table 2, a comparative analysis of different educational institutions was conducted, focusing on their construction materials, environmental sustainability, social interactions, accessibility, and integration with the natural environment. Additionally, the overall student experience was examined and recorded.

#### 4. Discussion and Conclusion

In the comparative study shown in Table 2 above, the architectural design of various educational facilities, including the primary case study Okan University was examined. By comparing Okan University with other selected campuses, it is aimed to uncover patterns, contrasts, and best practices related to building design, social dynamics, and cultural sustainability. Through this multidimensional exploration, a valuable insight into the diverse approaches taken by educational institutions worldwide is gained, ultimately informing the understanding of effective campus environments.

Well-considered choices regarding building materials can result in educational structures that are user-friendly, inexpensive, culturally appropriate, and ecological, enhancing urban life and promoting well-being. The quality of life for building occupants as well as many other aspects of urban life are significantly impacted by the design, materials, building orientation, and building techniques employed in educational buildings. These dimensions were looked into:

### **Environmental Impact:**

- **Materials Choice:** The selection of building materials affects the environment in terms of resource extraction, energy consumption, and waste generation. For instance:
  - **Sustainable Materials:** Opting for sustainable materials (such as recycled steel, bamboo, or reclaimed wood) reduces the ecological footprint.
  - **Energy Efficiency:** Materials with high thermal insulation properties can enhance energy efficiency, reducing the need for heating and cooling.
  - **Embodied Carbon:** Some materials have a higher embodied carbon footprint due to their production process (e.g., concrete). Balancing this impact is crucial.
- **Construction Techniques:** Efficient construction methods (such as modular construction or prefabrication) minimize disruption to the environment during building assembly.

### **Economic Considerations:**

- **Initial Costs:** The choice of materials and construction techniques impacts the initial cost of the building. High-quality materials may be more expensive upfront but can lead to long-term savings.
- **Maintenance and Repairs:** Durable materials require less frequent maintenance and replacement, reducing ongoing costs.
- **Life Cycle Cost:** Considering the entire life cycle (from construction to demolition), materials that last longer and require fewer replacements are economically advantageous.

### **Cultural and Aesthetic Aspects:**

- **Architectural Identity:** The materials and design contribute to the cultural identity of a place. Traditional materials (such as adobe, thatch, or timber) reflect local heritage.
- **Aesthetics:** The visual appeal of educational structures influences community pride and engagement. Thoughtful design can foster a sense of belonging.
- **Inclusivity:** Culturally sensitive design ensures that the building accommodates diverse users, respecting their traditions and needs.

### **Quality of Life for Building Users:**

- **Indoor Environment:** Materials affect indoor air quality, acoustics, and comfort. Natural materials (wood, cork, etc.) create a pleasant atmosphere.
- **Daylight and Views:** Properly chosen materials allow natural light penetration and views, positively impacting well-being.
- **Thermal Comfort:** Insulating materials regulate temperature, ensuring a comfortable learning environment.
- **Flexibility and Adaptability:** Materials that allow for future modifications (such as reconfiguring spaces) enhance usability.

Based on the research conducted and the survey carried out on Okan University students, it is observed that the students spend the most time in the lecture halls, hostels, and recreational buildings due to the nature of the activities that bring them into the campus environment. The preferred areas of relaxation varied between indoor and outdoor spaces. It is therefore recommended that when constructing educational facilities, sustainable considerations should be prioritized during the design, construction, and orientation of the buildings to achieve maximum quality of life, and comfortability and enhance the social sustainability of the students while on campus. It is recommended that Open plazas, communal areas, and collaborative spaces should be created as they encourage students to engage with one another, share ideas, and build lasting connections. The campus should intentionally provide spaces for cultural expression like art installations, exhibitions, and cultural events to celebrate diversity and promote cross-cultural understanding. Buildings should be designed to accommodate various cultural practices, ensuring that students from different backgrounds feel welcome. By nurturing vibrant, inclusive spaces, students are empowered to thrive, connect, and leave an indelible mark on the fabric of their educational journey. Prayer rooms, meditation spaces, and cultural centers also contribute to a harmonious environment.

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### **Conflict of Interests**

The Author(s) declare(s) that there is no conflict of interest.

## References

- Architecture - Faculty of Art, Design and Architecture - İstanbul Okan Üniversitesi. (2023). Okan.edu.tr. <https://www.okan.edu.tr/en/stmf/unit/45/architecture/>
- Amen, M. A., & Nia, H. A. (2020). The effect of centrality values in urban gentrification development: A case study of Erbil city. *Civil Engineering and Architecture*, 8(5), 916–928. <https://doi.org/10.13189/cea.2020.080519>
- Aziz Amen, M. (2022). The effects of buildings' physical characteristics on urban network centrality. *Ain Shams Engineering Journal*, 13(6), 101765. <https://doi.org/10.1016/j.asej.2022.101765>
- Auwalu, F. K., & Bello, M. (2023). Exploring the Contemporary Challenges of Urbanization and the Role of Sustainable Urban Development: A Study of Lagos City, Nigeria. *Journal of Contemporary Urban Affairs*, 7(1), 175–188. <https://doi.org/10.25034/ijcua.2023.v7n1-12>
- Gaha, I. S. (2023). Parametric Architectural Design for a New City Identity: Materials, Environments and New Applications. *Journal of Contemporary Urban Affairs*, 7(1), 122–138. <https://doi.org/10.25034/ijcua.2023.v7n1-9>
- Asif, M. (2009). Sustainability of timber, wood, and bamboo in construction. In *Sustainability of construction materials* (pp. 31-54). Woodhead Publishing.
- Berge, B. (2009). *The Ecology of Building Materials*. Routledge, 2009
- Baldo, G. L., Cesarei, G., Ministrini, S., & Sordi, L. (2014). The EU Ecolabel scheme and its application to construction and building materials. In *Eco-efficient construction and building materials* (p. pp. 98-124). Woodhead Publishing.
- Bovill, & Carl. (2015). *Sustainability in architecture and urban design*. Routledge, 2015
- Chemello, C., Collum, M., Mardikian, P., Sembrat, J., & Young, L. (Eds.). (2019). Aluminum: History, Technology, and Conservation. *Smithsonian Contributions to Museum Conservation*, 9, vi–220. <https://doi.org/10.5479/si.1949-2367.9>
- Dominique, G. M. (2002). "Sustainable architecture and urbanism." 34–35.
- Dunkelberg, K., (1985), *Bambus Bamboo*. Germany: Institut für Leichte Flachentragwerke (IL)
- Gowans, A., & Scruton, R. (2018). *Architecture | Definition, Techniques, & Theory*.
- Hahn, B., Vallée, T., Stamm, B., & Weinand, Y. (2014). Moment resisting connections composed of friction-welded spruce boards: experimental investigations and numerical strength prediction. *European Journal of Wood and Wood Products*, 72(2), 229-241.
- Horvath, M., Trachte, S., & Pardo, T. (2021). New circular building composite material to upcycle building wastes. IOP Publishing. in *Journal of Physics: Conference Series*, Vol. 2042(1).
- Kumar, R., Aggarwal, V., & M. Gupta Surinder. (2021). Sustainable materials and techniques in affordable high-rise buildings - A case study. *E3S Web of Conferences*.
- Janssen, J.J.A. (1990), The importance of bamboo as a building material, in Ramanuja Rao, IV.; Gnanaharan, R.; Sastry, C.B., ed., *Bamboos: current research*. Proceedings of the International Bamboo Workshop, Cochin, India, 14-18 November 1988. Kerala Forest.
- Jansen, J.J.A, (2000), *Designing and Building with Bamboo*. Technical Report No. 20: International Network for Bamboo and Rattan (INBAR), 2000.
- Kabir, M.F., Bhattacharjee, D.K., Sattar, M.A., (1993), Effect of age and height on strength properties of *Dendrocalamus longispinus*. *Bamboo Information Centre India Bulletin* 3(I), 11-15.
- Khalid, M. S, Zhanyong, Q, & Bibi, J. (2001). The impact of learning in a diversified environment: social and cognitive development of international students for a global mindset. *European Journal of Training and Development*, 50(6).
- Kuratu, N., Ozasa, T., Ueno, T., & Komatsu, H. (2013). Campus planning for promoting quality of life in the community. In *generative sustainable development of universities and cities* (pp. 236–253). Edward Elgar Publishing.
- L Volker. (2011). *Deciding about design quality: value judgments and decision-making in the selection of architects by public clients under European tendering regulations*. Sidestone; Oxford.
- Maurina, A., (2015), "Curved Bamboo Structural Element" in 2015 Proceeding of International Construction Workshop and Conference Parahyangan Bamboo Nation 2, 81-92.
- Nenadović, A., & Milošević, J. (2022). Creating Sustainable Buildings: Structural Design Based on the Criterion of Social Benefits for Building Users. *Sustainability*, 14(4), 2133.
- Pardo, J. M. F. (2023). Challenges and Current Research Trends for Vernacular Architecture in a Global World: A Literature Review. *Buildings*, 13(1), 162.

- Peter, Collins, Roger, Scruton, James, s, Ackerman, & Gowans. (2023, November 7). Architecture. Encyclopedia Britannica. <https://www.britannica.com/topic/architecture>
- Reddy, BV Venkatarama. "Sustainable building technologies." *Current Science* (20x04): 899-907.
- Rybak-Niedziółka, K., Starzyk, A., Łacek, P., Mazur, Ł., Myszka, I., Stefańska, A., Kurcusz, M., Nowysz, A., & Langie, K. (2023). Use of Waste Building Materials in Architecture and Urban Planning—A Review of Selected Examples. *Sustainability*, 15(6), 5047.
- Sharma, K. (2023, January 12). How is architecture influenced by the environment? RTF | Rethinking the Future
- Steiner, H., & Veel, K. (2011). Living Behind Glass Facades: Surveillance Culture and New Architecture. *Surveillance & Society*, 9(1/2), 215–232.
- Purwito, (2008), "Standarisasi Bambu sebagai Bahan Bangunan Alternatif Pengganti Kayu," in 2008 Prosiding PPI Standardisasi., 1-17.
- Schaubroeck, S., Dewil, R., & Allacker, K. (2022). Circularity of building stocks: modelling building joints and their disassembly in a 3D city model. *Procedia CIRP*, 105, 712-720.
- Singapore University of Technology and Design. (2015). World Construction Network.
- Singapore University of Technology and Design by DP Architects. (2015, June 5). Architizer. <https://architizer.com/projects/singapore-university-of-technology-and-design/>
- Soomi, K., & Kwon, H. (2018). Urban sustainability through public architecture. *Sustainability*, 10.4(1249).
- Sweller, J., van Merriënboer, J. J. G., & Paas, F. G. W. C. (1998). Cognitive Architecture and Instructional Design. *Educational Psychology Review*, 10(3), 251–296.
- United States Environmental Protection Agency. (2018, November 5). What is Environmental Education? | US EPA. US EPA. <https://www.epa.gov/education/what-environmental-education>
- Wilson, J. (2018, June 20). Social Sustainability and Architecture. BuildingGreen.
- Zilliagus, A. (2016, December 19). 16 Materials Every Architect Needs to Know (And Where to Learn About Them). ArchDaily. <https://www.archdaily.com/801545/16-materials-every-architect-needs-to-know-and-learn-about-them>