

A sustainable campus between theory and practice

Qassim University campus - A case study

Assist. Prof. Dr. Sherif El Sayed El Said Mohamed

**Assistant Professor at the Faculty of Architecture and Planning, Department of
Architecture, Qassim University, Qassim, Kingdom of Saudi Arabia**

sh.mohamed@qu.edu.sa

Abstract:

A sustainable or environmentally friendly building is that building in which there are many applications and practices that take into account environmental considerations in all or some stages of construction, starting from design, then implementation, to operation and maintenance, in addition to achieving energy efficiency, resources and water use, as well as the quality of the internal life of the building, and the impact of all this on the surrounding environment. Likewise, the university campus, whose sustainability is achieved by applying best practices inside and outside it as well. It began with the design of the university's buildings, including various environmental elements, through joint work and coordination between the various colleges of the university, and the effective organization between the administrative and executive departments to achieve this, and it ended with the effective participation of the university in its various departments with the local community, and the world as well.

Therefore, a sustainable campus must have many applications for reducing internal global warming rates, saving energy, rationalizing water consumption, fuel, costs, and other applications that will improve the public health of users over time, and this will in turn be reflected in the quality of the educational process and other activities related to this, in addition to the positive effects that this will have in the future on the performance and behavior of students, and all workers on campus. By reviewing previous studies, it was found that there are three main axes that a sustainable university must apply and develop continuously, these axes include both the administrative aspect of the university, and are related to sustainable administrative practices inside and outside the campus, which enhance the value and position of the university at the local and international levels, then study aspects of the sustainable participation of the university internally or externally, which increases the opportunities for environmental literacy of the community, whether inside or outside the university campus, in addition to studying the environmental architectural applications implemented inside the university campus, which will benefit policy-makers at the operational and strategic levels in making effective decisions that add value to the campus. Planning and architecture in the present and the future. Therefore, the main objective of this research is to study the three axes of educational sustainability, discuss all the points related to them on campus, and present what has been achieved in one of the Saudi universities (Qassim University - Al Mulida headquarters) for examination, verification, and comparison in order to know the strengths weakness, and then access to the best corrective practices that must be taken for better performance and efficiency. Then a set of findings and recommendations is coming up at the end of the research that must be followed to improve the environmental performance of the university to become a more positive and environmentally friendly campus in the near future.

Key words:

Educational sustainability, quality of life, sustainable campus, energy efficiency.

Research objective

The research aims primarily to study the concepts of sustainable educational development in higher education buildings (universities), and to show its importance in achieving the goals of the educational process, in addition to environmental, cultural, and social goals, not only for the users of those buildings, but also for the surrounding community. On the other hand, we shed light on the conditions and controls that must be followed to achieve the sustainability of the campus, which all universities must follow in accordance with the current global trend, by applying to an existing campus to monitor and analyze the sustainable practices applied in it, and to know the strengths and weaknesses, and then come up with a set of results and recommendations related to future improvement.

Research problem

When planning and designing university institutions in general, and the university campus in particular, sustainability factors are not taken into account, because some think that they are related only to high-priced architectural applications and equipment, which may not serve the university's policies, while these applications, even if their price increases, will they bear fruit in the near future, and most importantly, many practitioners do not know that there are other axes of sustainability, such as the administrative axis, the participation axis, and other axes that are no less important than the environmental axis, and as a result, these educational institutions no longer have the ability to adaptation and facing the expected environmental risks in light of the successive climate changes, as well as accommodating future educational needs in light of the tremendous technological development.

On the other hand, some universities believe that education should achieve educational and research goals only, without considering sustainable administrative, social, and environmental practices that must be applied within the campus, which will achieve in the future the advancement of the educational process of the university and the surrounding community as a whole.

Research Methodology

The research follows the inductive approach, by presenting the historical background to the sustainability of universities in general, and Qassim University specifically (as a case study), and then talking about the three major axes of educational sustainability (administrative, participation, and environmental) separately, and defining the components of each axis , conditions for fulfillment, then a comparison approach between that and what is currently applied on the campus of Qassim University, or plans related to future implementation, leading to identifying the strengths and weaknesses within the university campus, and then coming up with the most important results and recommendations that must be followed in order to raise the efficiency of the Qassim University campus in the present, and create an improvement for the better in the future.

1. Qassim University campus

The Qassim University campus is the main topic of the research. This is because it is the largest area and the most in terms of the number of colleges and students in it, as it includes the lack of educational, research, and social fields, in addition to sports facilities, and housing buildings for faculty and students.



Figure (1): Qassim University campus - Al-Mulaida City. Source: Google Chrome

2. Campus sustainability aspects

The sustainability of the campus is achieved by applying best practices within it. It started from the design of the campus buildings, including various environmental elements that achieve sustainability, through joint work and coordination between the various colleges, and the organization between the administrative and executive departments to achieve this, and ended with the effective participation of the university in its various departments with the surrounding local community ⁽¹⁾. Therefore, the sustainability of the campus must have applications for reducing internal warming rates, saving energy, rationalizing water consumption, fuel, costs, and other applications that will lead over time to improving the public health of users ⁽²⁾.

In order to achieve the four educational sustainability goals, researchers (Alshuwaikhat, et al., 2017) ⁽³⁾ developed a lengthy guide to the theories and practices of sustainable development in higher education institutions in developing countries. This theory is based on three main axes for the sustainability of higher educational institutions, which are (axis Administrative, participation axis, and environmental axis), as well as a number of strategies that must be followed when establishing a sustainable university. Therefore, the research will discuss these axes - separately, and then present what has been achieved of them in the university campus under study (Qassim University campus).

2.1 Administrative sustainability of the campus:

It includes (vision, policy, planning, and commitments) as follows:

2/1/1 sustainable vision

The vision of higher education institutions should be based on providing distinctive education that meets the needs of society and the labor market and thus contribute effectively to sustainable development, through applied research and the optimal use of modern technologies and active partnerships at different levels locally, regionally and internationally.

2/1/2 University policies for sustainability

The university's policies for sustainability are achieved by taking into account both ⁽³⁾:

- First: Carbon neutrality
- Second: Waste water
- Third: Active participation
- Fourth: Basic practices for sustainability

Qassim University has many practices related to this matter, such as providing an ideal educational and health environment for students. Also, some colleges such as the College of Agriculture and Veterinary Medicine offer local food products with approved standards and high quality.



Figure (2): Right (university workers during periodic sterilization operations), middle, left (one of the food products sales outlets affiliated to the College of Agriculture on the Qassim University campus). Source: the researcher

2/1/3 Sustainability Planning

This is done by developing a comprehensive plan for the university to achieve or move closer to achieving sustainability. This plan is implemented by developing a set of initiatives by the institution itself and not by individuals in the university, and this requires the existence of a comprehensive system that deals with sustainability completely. These initiatives may be with participation in international bodies and charters or partnerships that aim to inculcate concepts of environmental, social, economic and educational sustainability in colleges and universities, or by implementing sustainable practices plans within the campus, whether in existing facilities or planned to establish them. This was achieved on the Al Qassim campus by applying the following sustainable practices:

- First: The New construction
- Second: Car parking
- Third: University housing
- Fourth: Vital participation
- Fifthly: Distance education
- Sixth: Open surfaces

One of the conditions for university sustainability is that the campus contains green spaces that enhance the popularity of the idea of sustainability within. The university has paid great attention to this matter, despite the fact that the soil is desert



Figure (3): Some green spaces on Al-Qassim University campus, source: Google Chrome.

2/1/4 Commitments for Sustainability

It refers to the university's commitment to implementing one or more plans for green buildings such as the United States scheme (LEED), the UK scheme (BREEM), Australia scheme (GREEN STAR), or Germany scheme (DIGNB). The university also promotes aspects of sustainability and raises awareness of climate change in various ways, such as seminars, periodic events

- First: the strategic plans
- Second: scientific research
- Third: International conferences
- Fourth: Community Initiatives

The university's participation in the 'Green Qassim Land' initiative to plant 1000 seedlings in different locations such as schools and gardens.



Figure (4): The fifth stage of the Qassim University initiative to increase green spaces in Al-Qassim. Source: Google Chrome.

2.2 Sustainability with Participation

2/2/1 Behavior, awareness and readiness for change

This approach begins with introducing society to concepts related to sustainability in general, and university sustainability specifically for students, and then implementing sustainable practices (environmentally, economically, socially, and educational) through the campus life cycle (planning, construction, operation, maintenance, and retrofitting) in multiple ways. Such as (saving energy, preserving water, air quality, social justice, reducing waste, and encouraging walking), in addition to achieving (flexibility, multifunctionality, optimal use of spaces).

- First: The mission of the educational institution
- Second: local and international participation
- Third: courses and seminars
- Fourth: Academic courses
- Fifth: community service

The university offers many activities and events that are concerned with serving the community in general, and health and quality of life in particular, such as the initiatives undertaken by the Faculties of Medicine, Pharmacy, Dentistry, Architecture and Community Service Planning.



Figure (5): Right: College of Medicine's Community Service Initiative, Middle: College of Pharmacy Activity for Community Service, Left: College of Architecture and Planning for Community Service. Source: Researcher - Google Chrome.

2.3 Environmental Sustainability

It includes - Site accessibility, Climate considerations, Resilience, and Space use

2/3/1 Location and accessibility

- First: the location
- Second: Accessibility
- Third: Infrastructure

The following figure shows the campus road network, including the paving, planting, and lighting systems, which are among the most important infrastructure projects that are constructed in a sustainable campus ⁽⁴⁾.



Figure (6): Some of the infrastructure and equipment practices in the Qassim University campus. Source: Researcher - Google Chrome

2/3/2 Climate considerations

The Kingdom is considered a desert country, but this climate varies from one region to another due to the size of the subcontinent, so we find the southern part of the Kingdom with a moderate climate due to the large number of heights, while the western part is dominated by a dry climate, so these considerations must be considered as planning and design determinants. This is actually what was done when planning the campus of Al-Qassim University, where the international architect designer Kenzo Tang took the necessary measures when designing this campus to mitigate the impact of this climate, such as:

- Directing all buildings towards the original four sides (north, south, east, west).
- Designing all buildings on green internal courtyards, and placing the majority of openings on them, or for the interior like the main foyer.
- The use of light colors close to the color of the earth, externally and internally.
- The small size of the fireboxes with the frequent use of solar refractors in the facades to provide shadows on them.

- Take advantage of strong sunlight to illuminate many large interior spaces during the day.



Figure (7): Taking into account the environmental aspect when designing the Qassim University campus.

Source: Researcher - Google Chrome

3/3/3 Sustainability with flexibility

Flexibility here means flexibility of time, expansion in construction, and furniture:

- First: Time Flexibility
- Second: the flexibility of physical buildings
- Third: Furniture flexibility

Physical flexibility refers to the ability of space to modify the practices of individuals, in order to meet the sensory and / or movement needs of students, such as furniture and movable walls, or buildings that can be reconfigured, as well as rooms and corridors. The flexibility in the buildings has been clearly emphasized, as mentioned previously, through the campus's lands that allow easy future expansion, as well as the different designs for many spaces inside the campus, such as the main foyer that is used for more than one activity.



Figure (8): Flexibility of use to empty the main lobby on the Qassim University campus. Source:

Researcher - Google Chrome

3. Results

The Kingdom of Saudi Arabia is one of the most remarkably developing Arab countries, especially in the educational process in general, and the higher education in particular. This is in accordance with a long-term plan to advance global education, within the Kingdom's 2030 vision. One of the angles of this strategic plan is to expand the scope of higher education. Therefore, 20 new universities were built in the last decade alone. In order to accommodate the huge number of students who have joined or will enroll in these universities. The research evaluated the three axes of sustainable practice on the campus of Qassim University, considering it the largest university in the Kingdom in terms of area, and one of the most important sources of combined development inside and outside Qassim. These axes included both the administrative axis, the participation axis, and the environmental axis.

4. Recommendations

Educational sustainability practices have been identified in its three axes within the Qassim University campus. The study showed that the university is following the correct approach to achieve more competitive environmental viability, as many of the three axes' points have been achieved, but there are some important practices that have not been applied inside the campus, so they must be applied within the Qassim Mosque campus, and any other campus that seeks to achieve Sustainable development.

5. References

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