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Public Realm at Qatar University Campus: Perception and sustainability of Open Green Spaces

Soujanya Mogra[1], Dr. Raffaello Furlan[2]*
[1]Graduate Assistant, College of Engineering, Department of Architecture and Urban Planning, Qatar University
[2]Assistant Professor, College of Engineering, Department of Architecture and Urban Planning, Qatar University

***Corresponding Author:**
Dr. Raffaello Furlan
Email: raffur@gmail.com

Abstract: Open green spaces are considered as an integral part of university campuses worldwide and the related studies reveal the significant impact of the green spaces on the quality of life in the campuses. Thus, scholars have also stressed the need of revitalization of outdoor green spaces in the Qatar university campus. This research investigates whether students' perception has an impact on usability of green spaces, precisely, at the Women's Engineering Building of Qatar University. It also considers the extent to which regional factors, such as climate and privacy, as per Islamic value, impact the perception of usability of open green spaces. A review of the literature was conducted for exploring the regional influence on perception and usability of green spaces. Site visits and field observation were conducted to understand the spatial nature of the green spaces in terms of privacy and the types of green space usage in the surrounding areas of the Women's Engineering Building. User's perception of green spaces and their impact on usability were collected through survey questions and questionnaires. In contrast to the views of the scholars, significant difference between perception and usability of the green spaces along the year, the findings reveal that (1) a certain resistance to the usage of the green spaces occurs in summer; (2) there is no significant threat to the perception of privacy, which, in turn, has no impact on the usability of green spaces at Qatar University's Women's Engineering Building.

Keywords: University Campus, Green Spaces, Students Perception, Ethnicity, Climate

INTRODUCTION

The literature reveals that, more than a half the world's population is living in the cities nowadays. Also, it is estimated that 66%of the world's population will live in urban areas by 2050; cities are growing both in numbers and extents. The literature also reveals that cities are growing in an unhealthy manner, posing environmental challenges such as air pollution, Urban Heat Island effect, noise pollution, water pollution [1], vegetation and habitat loss due to the sprawling urban area [2]. Polluted water, air, soil due to various pollutants are taking a toll on public health. In addition to physical health problems, increased stress level due to demanding nature in work environment is one of the main concerns in the recent years [3].

Green spaces are considered to be beneficial in overcoming these challenges. Plants and trees sequester carbon dioxide, therefore, ameliorate the urban heat island effect [4]. They are beneficial in reducing noise pollution. Therefore, green spaces are part of healthier environment, acting as lungs in the cities. The presence of green space is associated with reduced mortality, obesity, depression, anxiety, cardiovascular disease. They promote physical activity and offer verities of opportunities for experiencing nature, social interaction and cohesion in the form of leisure and recreation [5]. Also, scholars reveal that superior aesthetical quality of landscape helps to build a sense of community and has a significant role in establishing community identity, solidarity and security [65].

In the city, university itself forms a community [6, 7]. Scholars have noted that, there is a dearth of research about how individuals use the outdoor environment in a campus setting, although, outdoor spaces determine both students' and faculty members' perceptions of the campus [8]. As explained, green spaces are most remembered as (A) outdoor spaces in the campus where people congregate to walk, talk, study, and relax and as (B) incidental spaces where people encounter [9 - 17].

A research on 'The Relationship between Student Use of Campus Green Spaces and the Arboretum and Perceptions of Quality of Life' indicates that, the undergraduate students, who used the campus green spaces and the arboretum more frequently, rated their overall quality of life higher compared to the students who used the campus green spaces and the arboretum less frequently [18]. Another research found out that, high school students in rooms with windows

were generally happier [9] . Therefore, research on people-plant relationships could prove beneficial.

Qatar University campus has number of green pockets of various types such as preserved green spaces, plantations, gardens etc. Gardens between the buildings are the most accessible spaces for students [17]. This study investigates students' perception of campus open green space at Qatar University Women's Engineering Campus and investigates whether perception has impact on the usability. Qatar University Women's Engineering Building is surrounded by such green space concentration. Therefore, this research investigates surrounding green spaces of the Women's Engineering Building (Figure 1-2-3-4).

Fig-1: Qatar University Master Plan (Source: (Wheeler, [64])

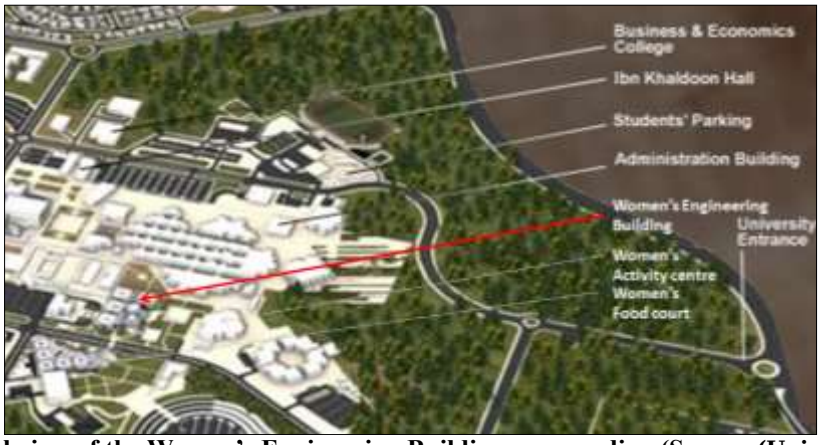

Fig-**2: Aerial view of the Women's Engineering Building surrounding (Source:(University, [63])**

Fig-3: Green Space at University Mosque area (Source: Magazine, 2016)

Fig-4: Green space at Men's engineering building (Source: Week, 2013)

Background

Universities' Learning Environment

Education system at the universities has been evolving. Conventional education system was structured around lecture deliveries by the scholars. Learning experience was limited to class rooms and library [20]. Hence, designers focused more on designing class rooms, corridors, and libraries' studying rooms. Modern education system is interactive in nature: students have access to the Internet conveniently. Hence, the source of knowledge is not limited by books and instructors: students' learning activities are extended beyond the classrooms and the campus.

Education system at the universities has become student-oriented by nature. They are required to explore and discuss various topics related to their programmes, which include assignments and exams. The academic performance of the students is greatly measured by their ability to efficiently complete the assigned tasks on time. The limited time leads to long working hours. One of the studies indicates that, human brain requires energy to extract necessary information from the information pool. Continuous long-term activity or intense short-term activity would cause mental exhaustion. That would decrease the efficiency of the brain and lead to errors [21]. As a result, students may feel stressed and perform poorly. One of the research estimates that, 40%-50% of the graduate students perform inadequately and some even decide to quit the programme due to mental stress. Along with the poor performance, the stress effects both psychological and physical health such as, depression, blood pressure, heart attack, diabetes etc. Hence, mental rejuvenation is essential for the progressive learning.

Some researchers argue that green gardens have healing effects in the process of relieving mental and physical fatigue [22]. Direct contact with nature acts as healing therapy [23]. Various landscape features in green spaces, specifically natural elements such as green plants, flowers and water, reduce stress [24]. Surveys state that the majority of students chose natural settings to elevate their mood when they are emotionally and mentally upset [25]. Also, active involvement in nature is proven to be beneficial in improving self-esteem [25].

Aesthetic quality of the green spaces (colors, structure, forms and densities of woody vegetation) impacts the emotional and mental health of the students [21]. Same research investigated the relationship between physical environment and various aspects of quality of life. As per the research, people who are in contact with nature are happier and satisfied with their job and home. It is found that the students opt to study in a campus based on its appearance [26]. therefore, well-designed green spaces would attract more students to the campus. There is also an argument that aesthetic quality of landscape design is advantageous in establishing campus identity, foster alumni sentimentalism, creating sense of community. Therefore, some scholars have argued that creating attractive campus to facilitate quality of life should be the aim of university campus design [27].

Most of the university campuses around the world have been taking leadership in green and sustainable revolution [28]. Open spaces are considered of prime importance in achieving sustainable micro ecology which accommodates diverse plants with compatible species and acts as ecosystem services. Such services positively influence emotional and mental health of the students and are considered as a part of healthy campus. Previous research shows that the effectiveness of green spaces depends on how people feel about them and utilize them [8]. Hence, it is imperative to understand the relationship between perception and utilization of green spaces in university campus.

Qatar University is one of the larger university campuses in Qatar, actively participating in sustainability initiatives. It has signed Memorandum Of Understanding with Gulf Organization for Research and Development to develop a general framework for co-ordination to teach and integrate GSAS (Global Sustainability Assessment System) into the university's education curriculum to raise awareness of sustainable

building practices and encourage optimum consumption of energy, water and environmental resources. It is evident that, Qatar University sets an example for promoting sustainable initiatives. Therefore, Qatar University is considered as ideal place to conduct research on perception of sustainable open spaces.

Green Spaces and Perception

One of the definitions of urban green spaces is *"public and private vegetated open spaces which are either managed or unmanaged natural areas, which are directly or indirectly available for users".* This definition is agreed upon by ecologists, economists, social scientists and planners [29]. It can also be understood as land that consists of permeable and unsealed "soft" surfaces such as soil, grass, shrubs and trees irrespective of the management and accessibility by the public. It includes all areas of parks, play areas and other green spaces specifically intended for recreational use, as well as other green spaces with other origins.

Previous research suggests that urban people want to feel that they are closer to nature [30]. Green spaces are the way to retreat from busy city life in urban area since they can find peace in them [30]. Hence, how individuals feel about green spaces is a cardinal aspect in green spaces design. In one of the studies, perception is defined as transaction between person and the environment they are placed in [31]. This means different individuals will perceive landscape differently. These perceptions are mediated by preferences in terms of needs and desires based on psychological, cultural, social and physical context.

Most of the researches on urban green spaces focus on environmental perception. Environmental psychology of urban green spaces states that such research findings are contradictory since the cultural and symbolic value of the green spaces are beyond their appearance [32]. Hence, culture plays an important role in the green space perception. Research on contemporary open space in Middle East region highlights the problem of national identity since they are designed based on western open space model [33]. Therefore, design needs to reflect Islamic social-religious values. In the meantime, contemporary necessities cannot be ignored.

The physical and non-physical aspects of green spaces together decide how students respond and react in them [34]. It has been argued that university campus green spaces are designed to emulate nature and be 'beautiful and uplifting' [35]. According to the literature, affective quality of such places in campus can be measured from these responses [8]. Exploration of user's perception of places and their preferences of landscape styles, provide insights into human-nature integration [36]. Furthermore, place-specific experience through self-reported perception highlights the importance of quality of such places [34]. Contact with nature and opportunities for social interaction, is considered as positive experiences of green spaces [37]. It is found that the green space in the campuses not only provide opportunities for relaxation, recreation and social interaction, but also, serve the practical purposes in encouraging student recruitment and funding [27]. Therefore, research on students' perception of campus green spaces is important in achieving sustainable outdoor spaces in the campus.

Previous studies on campus outdoor spaces indicated the requirement of green open spaces in the campus [38]. In their research, 34% of the survey expressed their interest in having more green spaces and trees. However, the research mainly dealt with the aspects of the design of the outdoor spaces. Since perception of green spaces play a major role in the overall sustainability of the green spaces, this study at Qatar University Women's Engineering Building emphasizes on the perception and utilization of surrounding green spaces.

Qatar University

Qatar is oil-rich country and it has an ambitious vision for its sustainable future. Qatar National Vision 2030 (QNV-2030) is based on four pillars of sustainability- economic, social, human development and environmental - to create secure future. Under human development, education has been one of the prime components in the vision. Qatar has been encouraging to create research environment in education institutes by investing on education institutes. Qatar University is the national university and it has significantly contributing to Qatar National Vision in terms of providing education to both national and international student [39 - 42].

Qatar University campus, recently identified as one of the "most beautiful" campus in the world, established in 1973, is located in the outskirts of capital city Doha, built on eight square kilometers area of land [43]. University has high caliber professors and researchers who are actively involved in research activities. According to Quacquarelli Symonds (QS) World University ranking, Qatar University is within top 400 varsities and ranks 9th in the Arab region [39]. It also serves on behalf of the government by collaborating and facilitating private industry to conduct regional research, particularly in areas of the environment and energy technologies.

As per Qatar University's official website, there are over 17,000 students enrolled at university. The student body, of nearly eighty-five nationalities, consists of 53% Qatari nationals and 47% expats. Women consist of approximately 75% of the student population are provided with their own set of facilities

and classrooms. In late 2008, for the first-time, women were accepted into the electrical engineering department in the hope of cutting back Qatar's dependence on foreign workers for research and development work. The university also recently started engineering programs for women to study architecture and chemical engineering. At present, The College of Engineering currently offers 6 undergraduate programs for female students. Architecture, Chemical Engineering, Computer Engineering, Electrical Engineering and Industrial and Systems Engineering currently are administered by 6 departments in the College.

Qatar University's Women's College of Engineering is located at the heart of the campus. It is surrounded by food court, library, activity center, sports complex within the walkable proximity of 500 meters. The building is surrounded by number of small green patches with seating arrangements. This area has highest concentration of open green spaces in the campus which makes it an interesting study to find out student's perception of green spaces and to know whether their perception reflects the usability of the green open spaces.

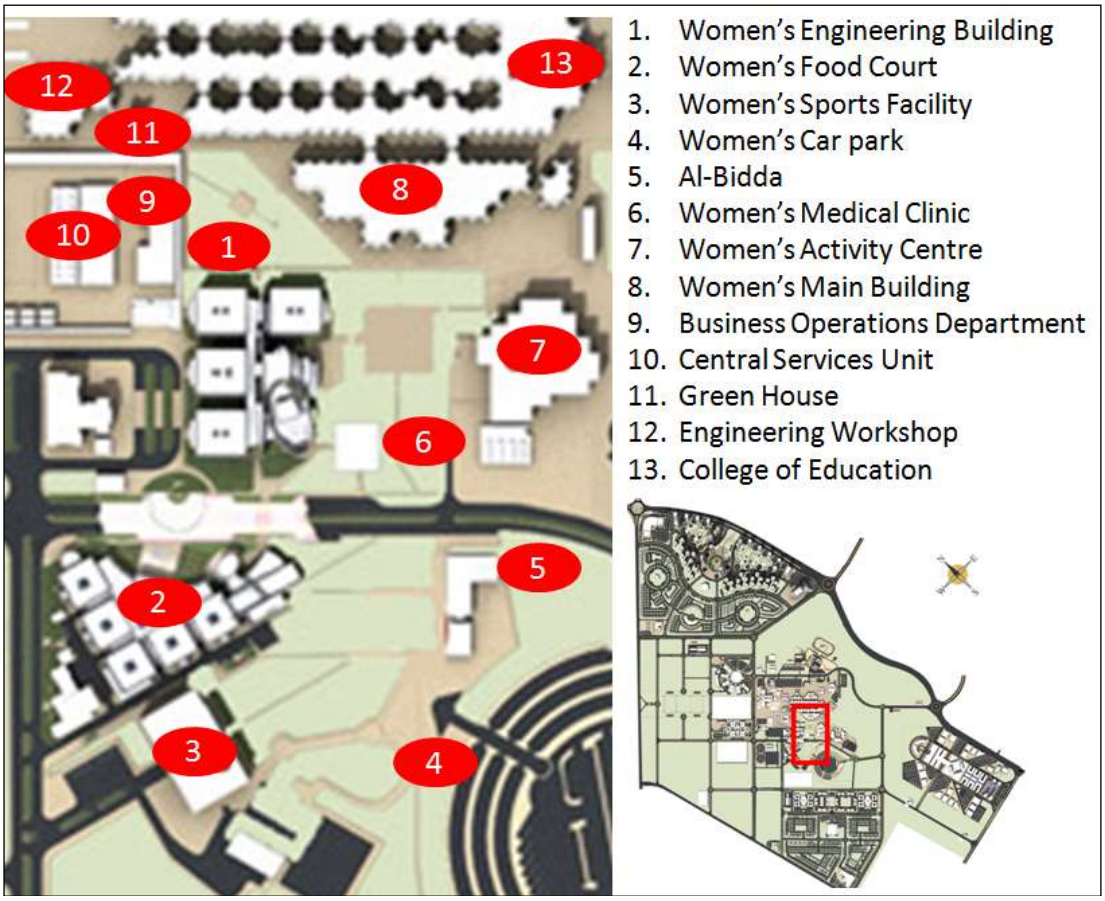

Fig-5: Qatar University Women's Engineering Building Surrounding (Source: By the author)

According to previous studies there are two non-physical factors which have influence in usability of the green spaces in Islamic societies: cultural value and climatic conditions [17].

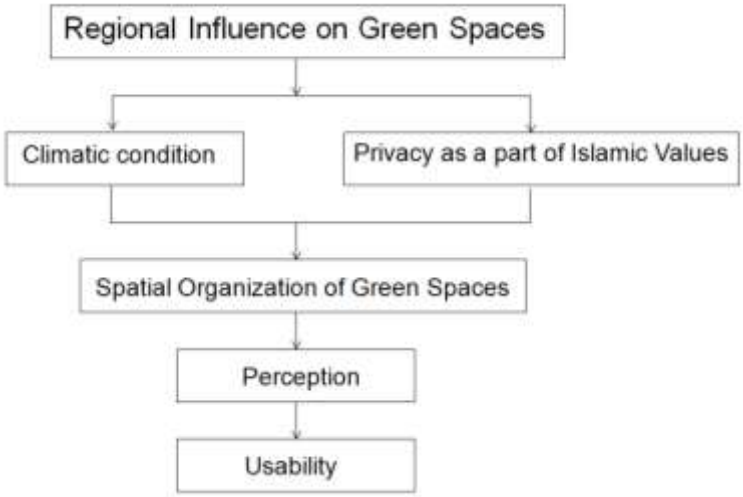

Fig-6: Influence of Non-Physical factors on Green Space perception and Usability (Source: By the author)

Culture and Usability

It has been argued that person's interest in green spaces is based on his perception. People always have the need to connect themselves with the place they are in. They not only connect with the place but also form sense of attachment to the environment. Rapoport argued that places have hidden messages and meanings beyond their physical features. Culture is one of the important non-physical factors associated with the place which has influence on human behaviour [44]. Human behaviour is derived from culture and activities, emerged from the behaviour. Furthermore, built-environment is created to support these activities [17]. Hence, activities influence the nature of place and built-environment can be understood as cultural manifestation of the society, which decides the nature of the enclosed spaces.

Cultural identity is deeply rooted in Islamic settlements. In an Islamic culture, privacy is highly regarded and invasion to privacy is banned and criticized [45]. In traditional Islamic settlements, economic activities that involved exchange and public presence were separated from residential use where gender segregation was part of culture [45]. It is mentioned that, in Islam, privacy is not imposed on individual on spatial means, but, it is a way of life. Built form was rationally organized to create privacy [46]. Traditional Islamic gardens within urban setting were enclosed courtyard spaces. Theses gardens represent the concept of openness and stand in contrast to the courtyard which is typically confined within the walls of a building representing centrality and stability [47]. Privacy is considered as an essential aspect of the gardens where gender segregation plays important role in Islamic cities as a reflection of local culture [33]. Investigation of enclosure or surrounding buildings in terms of spatial segregation is an important aspect of this study as it influences the perception, thus, effects the usability of the green spaces.

Climate

Traditionally, Islamic gardens were symbol of paradise on earth. The purpose of these gardens is to produce a sense of delight and provide a space for retreat through plants. It expresses the relationship between nature, life and the soul creating a place for reflection and observation. Furthermore, Islamic garden concept originated in hot-arid region. Therefore, the role of landscape design was not only limited to ornamental and theological function but also regulated the micro-climate. Landscape element such as water and vegetation were used for cooling garden and surrounding buildings as well [46]. Qatar University is situated in hot-arid climate. From May to September average temperature surpasses 45C. Therefore, climatic consideration in the usability of the green spaces is essential in this research. This research also discusses students' perception of water and vegetation feature of the garden.

The Research Design

This research investigates whether students' perception has an impact on usability of green spaces, precisely, at the Women's Engineering Building of Qatar University. To deal with this multifaceted question, a number of specific sub-questions will be addressed:

- What is Qatari students' view on green spaces at the Women's Engineering Building?
- Do their perception of green spaces affecting its use?
- Are existing green spaces perceived effectively?
- Do regional factors, such as, climatic conditions and privacy as a cultural value, influence the usability?
- What are students' favorite landscape-features in the surrounding green spaces?
- What students want to include in the surrounding green spaces?

- Does current green space have community value?

In this exploration, both qualitative and quantitative methods were used to observe and measure perception, namely visual observation and survey questionnaires [48 - 56].

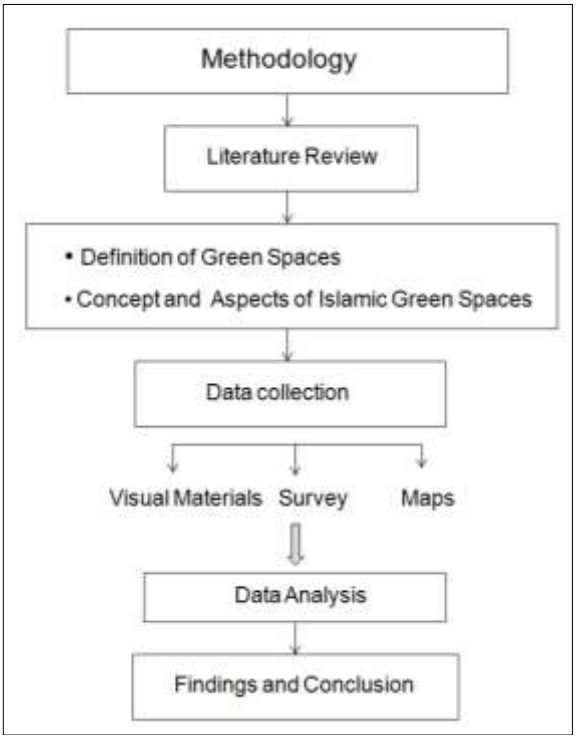

Fig-7: The Research Design (Source: By the author)

Data Collection

Green space definition and philosophy of perception was arrived after referring previous research papers on perception of green spaces. Region-specific influence of non-physical factors was identified by the past literature on the built-environment of Islamic societies. Nature of the built-environment in the study area was analyzed through visual observation.

University Master Plan was analyzed to understand the physical organization of the buildings within the campus. After identifying the green spaces within the walkable distance from the Women's Engineering Building, the field visit was conducted. Camera was used in visual survey to capture various types of green spaces and activities in those green spaces were noted. Visual observation was conducted in various times of the day included morning, afternoon, evening and night time.

Due to the limitation of available time to conduct the research, survey method was chosen. In the data arrangement of open-ended questions, word scheme was used rather than entire sentence because it was much easier way to gain more information on categorized responses. This research methodology is inspired by the research project carried out at the University of Dalhousie campus [57]. However, in this research, field visit and observation were conducted to gain more information about non-physical factors which could influence perception and usability of green open spaces of Middle East Arab region.

In order to qualify the survey, participants had to be full-time students in the Women's Engineering Building and also, they had to be Qatari nationals. To assume normal distribution, 20 subjects were sampled.

Experiment proceeded with carefully prepared survey questionnaires to collect information on perception and usability of open green spaces. Surveys included optional questions to collect quantitative data. The rank scale and multiple choice methods used in survey questions served as a measurement of perception. These types of questions focused on various aesthetic and utility preferences and climatic condition influence on perception and usability of surrounding green spaces. Open-ended questions were asked to observe the data. Participants' answers for open-ended questions also served as useful suggestions for further research.

Survey questionnaires were distributed primarily at the Women's Engineering Building. They are distributed at the different locations of the building on different days to avoid sampling the same subject twice. Surveys are carried out both inside and outside the

building and questionnaires were handed out randomly. In-person sampling carried out in between 20th October to 25th October 2016.

Data collected was organized and categorized based on their properties. Visual observation data were collected in the form of map and photos and categorized into types of green spaces. Usability of these green spaces was noted.

Survey question data was categorized into various categories which included perception of surrounding area as 'green', user's satisfaction, perception of attractiveness of the green spaces, perception of green spaces usability versus actual usability, perception of usability and actual usage – winter versus summer, comparison between number of visits in summer and winter, perception of quality of green spaces, perception of privacy, perception of privacy. Percentages were calculated and used them to create comparative graphs for different questions.

Data collected from open-ended questionnaires were coded by examining the categories that emerged from responses by using Context Sensitive Scheme [58]. Bits (Words) of the answers grouped into Definition of 'Green Spaces', visual aesthetic feature and potential elements to enhance usability. These categories were derived from the substantive theories.

Data Analysis

Visual Observations

Master Plan of the University was analyzed. Major proportion of the green spaces at Qatar University Women's Engineering Building is surrounded by Women's Main building, Women's Activity Centre, access road and Business Operations Department. It is situated in already gender segregated location.

Field visit was followed by visual survey to identify the types of usability and types of green spaces at Women's Engineering Building. Types of usability were listed as cherishing nature and relaxation, individual and combined study, spending time with friends, eating. These activities took place both in open green spaces and secluded green spaces at the building.

Fig-8: Garden at the Main entrance to the building

Fig-9: Green Arches in the garden

Fig-10: Garden in front of Women's Main Building

Fig-11: Fountain in the garden

Since the weather was comparatively warmer during the research, most of the students used green spaces only in the evenings and mornings. Therefore, influence of shading elements of the garden usability could not be mapped. However, a few of them who used green spaces during other time of the day were seated where building itself acted as shading element in the surrounding green spaces.

Survey Data Analysis

Perception of Surrounding Area as 'green'

A question was asked to collect data on overall perception of surrounding green spaces by asking participants "Do you consider surrounding area is green?" followed by answer choices "Yes" and "No". For this question, 75% of them replied "Yes" and 25% of the participants marked "No". Therefore, majority of the participants perceived that the surrounding green spaces are green. To support this question, another question was asked, if given a chance, whether they like to change the amount of existing green spaces at the building. Among the respondents, 55% chose "Increase the amount of green spaces" and 15% of them chose "Decrease the amount of green spaces" and 30% of the total respondents preferred maintaining the existing amount of green spaces. Percentage of students who would like to change the amount of green spaces on campus can be seen in Figure 8.

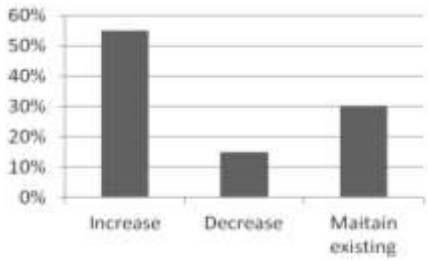

Fig-12: Green space maintenance (Source: By the author)

User's Satisfaction

In one of the rank scale multiple choice questions, participants were asked to mark their satisfaction level about the green spaces. of the given options to answer were Very satisfied, Dissatisfied, Neither Satisfied nor Dissatisfied, Satisfied, Very

Satisfied. 10% of the participants marked "Very Satisfied", 30% were responded "Satisfied", 15% of the participants were dissatisfied. Among the participants, 5% were very dissatisfied with the existing green spaces and 20% of them did not answer this questionnaire. Participants' satisfaction level of green spaces can be seen in Figure 9.

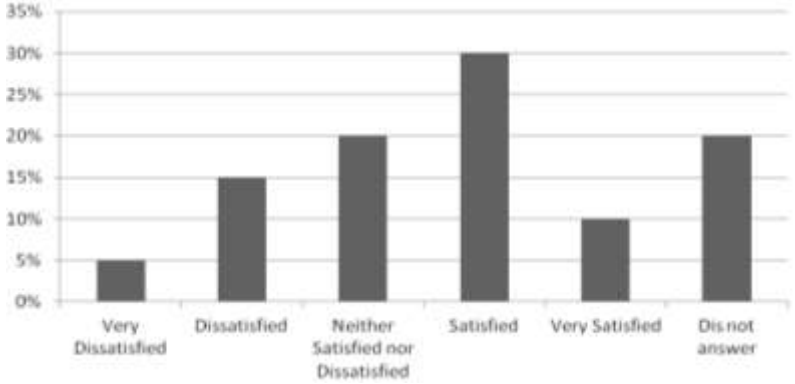

Fig-13: Satisfaction level of the participants (Source: By the author)

Perception of Attractiveness of surrounding green spaces

To measure the perception of attractiveness of the green spaces, participants were asked - "Do you think surrounding green spaces are attractive?" For this, 75% of the participants answered "Yes" and 25% of the participants answered "No" in the choices of the answers provided.

Perception of Green Spaces Usability versus Actual Usability

Participants were asked to answer two questions to find out perception of usability of the green spaces and actual usage. First, they were asked "Do you spend time in surrounding green spaces often?" After a couple of questions in the survey questionnaire sequence, again they were asked "Do you think students use green spaces often?" 60% of the participants thought that surrounding green spaces are often used and 40% of the participants did not think surrounding green spaces are often used. In fact, 40% of them used green spaces often and 60% of the participant did not used surrounding green spaces. Chi-square value was of perception of use versus actual use was 1.6. The p-value was 0.2. Hence, there was no significant difference between perception of use and actual use of green spaces.

Perception of Usability and Actual Usage – winter versus Summer

A comparison between participants' perception and usage winter versus summer can be seen in Figure 10. 80% of the participants did not use green spaces in summer and 60% did not think green spaces are used effectively in summer and 40% of the participants thought they green spaces are used effectively in summer. 90% of the participants used green spaces in winter. 50% of the participants thought green spaces are used effectively in winter and 50% of the participants did not think green spaces are used effectively in winter and other 50% of the participants thought green spaces are used effectively in winter and cooler months. Chi-square test was conducted for usability of green spaces summer versus winter. Chi-square statistic found to be 98.9899. The p-value was close to zero. Therefore, there was significant difference in usability pattern in summer versus winter.

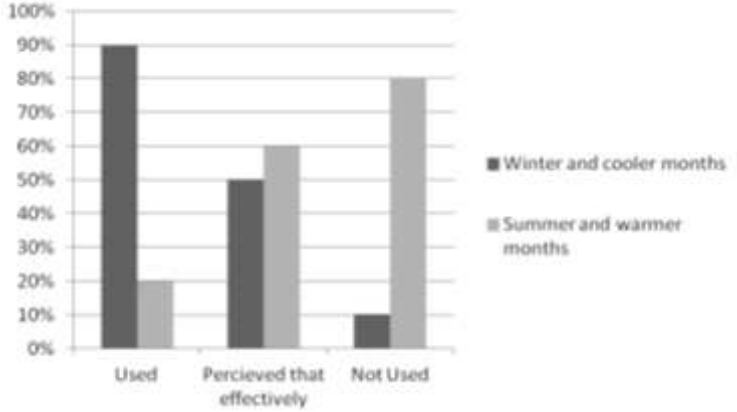

Fig-14: Comparison between students' perception and usage, summer versus winter (Source: By the author)

Comparison between the number of visits in summer and winter

A comparison between number of visits to campus green spaces in the winter and summer are shown in figure 11. The 80% of the participants marked that they do not use green spaces in summer; most common number of visits was 0. In winter and cooler months, 25% of the participants marked that they use green spaces 4 or more times a week, 30% put 3 times a week, 20% put 2 times a week, 10 of them have out once a week and none of them have put zero times. To this questionnaire 20% of the participants did not answer.

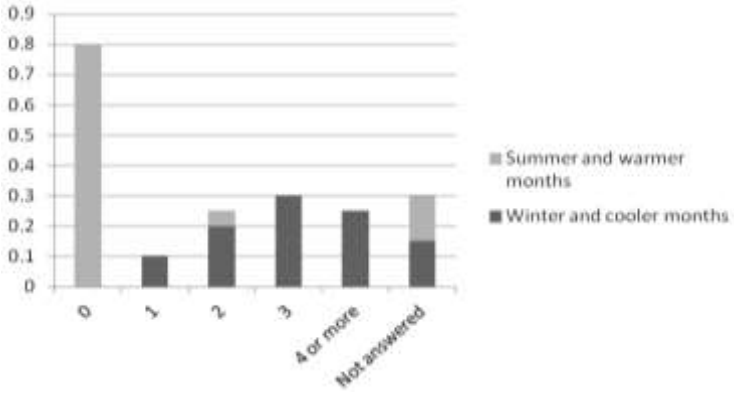

Fig-15: The number of visits to green spaces in summer and winter (Source: By the author)

Perception of Quality of green Spaces

In one of the previous researches, scholars have described public perception of environmental quality as 'clean', 'well-maintained' and 'aesthetically pleasing'. It was argued that users perceive a high aesthetic quality as a sign of care which likely to lead to a sense of community [59]. Therefore, we have included them to collect data on perception of quality of the green spaces as a rank scale multiple choice question. To determine the overall satisfaction scale was used in the questionnaire by giving them the choice of Very Satisfied, Satisfied, Neither Satisfied nor Dissatisfied, Dissatisfied and Very Dissatisfied.

Perception of quality of green spaces was arrived by asking them two main questions in two different instances. First question address the perception of maintenance of the green spaces and second question was asked to find out their preferences of vegetation appearance that is neat and clean versus natural and wild. 70% percentage of the participants thought the green spaces in campus are well maintained and 30% of the participants did not think surrounding green spaces are well maintained. 45% of the participant's preferred neat vegetation and 55% of the participant's preferred wild and natural vegetation.

Perception of Privacy

To understand the type of open space requirement, a question was asked regarding their preference on secluded green spaces and open outdoor green spaces. 75% of the participants preferred open spaces against secluded spaces which show that majority of the participants are comfortable in terms of privacy.

Understanding of the term 'Green Spaces'

In one of the open-ended questions participants were asked to define green spaces. 85% of the participants answered the questionnaire. Purpose of the question was to determine common understanding of the green spaces by the participants. Some of them have given long descriptive definition and many of them have written simple words. A few common words and understandings were selected to come up with the definition of green spaces as per participants understanding. Common words included place, trees and plants or greenery, nice to look at/good view, for enjoyment/relaxation/refreshment/comfort in terms of seating, well designed. Therefore, participant's perception of green spaces can be written as "Well-designed spaces with vegetation which are pleasing to the eyes and serves the purpose of enjoyment, refreshment and relaxation". This highlighted the common belief about the purpose of green spaces in university campus. To get more information on participant's belief about purpose of green space on campus another similar question was asked. The question was "What purpose green spaces serve on campus?" Answers for this question were included common words as aesthetic, cooling, refreshment and relaxing. Therefore, purpose of green spaces in campus as per participant's view seems like aesthetic, leisure and regulation of the micro climate.

Visual Aesthetic Feature

In the next question, participants were asked to answer what strikes them the most in campus green spaces to find out how they identify the green spaces. Their answers included huge trees, green arches, water features, seating area and lighting. 85% of the participants have answered this question. 10% of the

participants answered that none of the features struck them. That means these elements are producing the impression of the campus landscape. When they were asked to answer, what is the best feature in the campus landscape, majority of them wrote fountains, tree arch and flowers. It indicates that, in existing campus landscape, these are the features they like.

Potential elements to enhance usability

The next question was to find out what they would like to see added in the campus green space. They were also given the examples such as wilder green spaces, vegetation diversity, local species, flowers etc. Majority of them wanted to see added flowers, wilderness, seating area and shading.

Findings

Chi-square statistical function indicates that, there is no significant difference between students' perception of green space usage and actual usage. 75% of the participants thought that surrounding green spaces are attractive, that means they are pleasing to the eyes. However, 40% usability indicates on par effectiveness of the green spaces, which contradicts attractiveness measure. Therefore, there is a gap between attractiveness of the green spaces and actual usage of the green spaces.

The measure of satisfaction level, 30%, indicates that, participants are happy with the surrounding. This was determined by their choice of answers such as 'Satisfactory' and 'Very Satisfactory' options given in the survey question. 30% of the participants were neither unhappy nor happy with the surrounding green spaces. 20% of the students did not answer this question. Since 20% of the participants did not answer this question, it is difficult to arrive at the conclusion on this survey question.

Furthermore, test on the influence of climatic conditions indicates that it has major role in the usability of surrounding green spaces since majority of the participants did not use green spaces in summer. The test on the influence of Islamic values of privacy on usability indicates that, there is no cultural resistance for visiting surrounding green spaces. As there is very less participants who preferred secluded green spaces, we can understand that there is no cultural resistance for visiting surrounding green spaces.

When we asked them what they liked to see added, their answers such as wilder green spaces, vegetation diversity, local species, flowers indicate that they are looking forward to having more natural aesthetic spaces added in the existing landscape. While defining the green spaces, participants have expressed their common belief about green spaces in the campus which included contact with nature, comfort and mental benefits. It depicts their aspiration. Their liking towards landscape features such as trees, flowers and fountains suggests what they like to see more in the surrounding green spaces.

Pleasant experiences will be a part of their memory which would strengthen the alumni sentiments. We also got an opportunity to interact with the participants while distributing and explaining the survey brief. This helped in knowing more about their feelings towards the surrounding green spaces. Some of the participants expressed their anger while explaining the loss of huge trees in the gardens since those trees were cut for beautification. Students have included this incident in one of the educative video they prepared. Therefore, it is evident that the existing green spaces have the potential to form community spirit.

CONCLUSIONS

The experiment indicates that there is no significance difference between the perception and usability of the green space. It also indicates that privacy as an Islamic value has no influence on the usability. Therefore, there is no influence of perception on the usability of surrounding green spaces. However, usability of green spaces is affected by climatic conditions.

75% of the participants thought that surrounding area is green, attractive and well maintained which is the clear indication of overall effectiveness of the surrounding green spaces. Therefore, surrounding green spaces are effectively perceived by the students.

As discussed in the literature of the research, water bodies and trees can be used for both passive cooling and aesthetic purpose which are considered as traditional elements of the Islamic gardens. Majority of the participants have listed these aspects of the garden as the most liked feature. Hence, they can be affectively used in the design of green spaces for regulating micro climate, thereby, in enhancing the usability of surrounding green spaces.

This research is successful in identifying students' perception of surrounding green spaces of Qatar University Women's Engineering Building. This experiment serves as a model experiment to evaluate green spaces in rest of the zones in the campus. Therefore, it is new addition to previously conducted researches on quality of outdoor spaces in the campus.

Future Research

75% of the participants thought that surrounding area is green, the study area had the maximum concentration of green spaces compared to the rest of the campus area. Hence, students' perception of green spaces in the study area may not be comparable with their perception of the rest of the areas in the campus. Therefore, pilot surveys need to be conducted in various

zones of the university such as men's campus, common zones of all students to find out overall perception of green spaces in the campus.

The research was limited on sample size, which depended on how many subjects completed the survey or questionnaire within the time limit. Most of the respondents to the survey questionnaire were architecture students and they were easily available to us. Therefore, diversity is missing in the composition of the participants in this research. Also, including faculty members and staffs in the survey would have given more clarity to the research. Research was also limited on outdoor distribution of survey questionnaire because of the warmer weather condition during survey period. A longer time dedicated to sampling would have generated greater in-depth responses from participants and accurate statistical results.

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