Research Article
Investigating the Quality of Open Educational Spaces: The Case of Al-Bayt University Al-Mafraq/Jordan

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Abstract: In university educational environments, public open spaces play an important role both socially and academically not only as means of social interaction but also as means for formal and informal education. It can promote the sense of community derived from actively shared space and provide for the enriching experiences of both planned and chance encounter. This study aims to investigate the open spaces in educational environment taking the two main squares of the Al-Bayt University: Kurish and Bani Hashim as a case study. First, the design quality of the open space is analyzed. Second, a study of the landmarks inside the Kurish and Bani Hashim squares will be examined. A visual study of the spatial capacity of these open spaces will be studied with its three components, the spatial orientation, the spatial visualization and the spatial relations and a number of photographs will be analyzed. At end several conclusions are reached to improve the quality of these spaces and the space perception which is dependent on the distance between users and objects, the orientation and the movement of users in the space and other factors.

Keywords: Environment, open space, square, way finding

INTRODUCTION

Public outdoor spaces are created on the premise that the provision of such spaces for people to see, meet and use common facilities will lead to higher social interaction between various users and accordingly increase the vitality of these spaces (Lette *et al*., 2010). This is also true for university campuses: while the physical character and quality of a university campus is defined by both its buildings and its open space, it is the open space which has the greatest potential for unifying and equalizing the shared space of the campus (Anonymous, 2009). Academic spaces can promote the sense of community and provide for the enriching experiences of both planned and chance encounter (Pretorius, 2009). As such, these spaces play an important role not only as means of social interaction but also as means for formal and informal education.

Public outdoor spaces are "all publicly accessible open places designed and built for human activity and enjoyment." (Francis, 1987; Gehl, 1987) identified three types of activities that take place in outdoor public spaces: necessary activity, optional activity and social activity. Each with a certain physical structure to facilitate its occurrence and the physical environments needed for different types of activity are significantly different from each other Shu-Chun (2005). Open outdoor spaces are usually perceived as areas for optional and social activity, mainly interaction and

recreation (Unger and Wandersman, 1985). When individuals are alone, they tend to go to a lively place; individuals are attracted by the presence of other people in public spaces (Whyte, 1980). Sociable spaces attract more individuals than less sociable spaces (Whyte, 1980). These spaces are established through the use of environmental surfaces that form the substance and the experience of the visual world (Thiel, 1997). This study examines the effect of space's degree of enclosure and exposure to spatial perception, space use and pedestrian flow in Academic settings.

Al-Bayt University is located on the outskirts of the city of Mafraq, about 65 km to the north-east of the capital Amman-Jordan. The region has a desert climate. It tends to be rather hot and dry during the day and in the summer and relatively cold during the night and in the winter. The university integrates academic facilities, student housing and social services at one campus, extending over an area of 7.539 km^2 (Fig. 1). The University, designed formerly as military camp, received its first group of students on October 1, 1994. Since the establishment of the University, the area has been transformed into an oasis in the desert through the implementation of new schemes of plantation, combating desertification and preserving the indigenous species. Water harvesting in this arid area has proven to be successful.

The University, which is witnessing a large increase in student numbers, total number of students for the
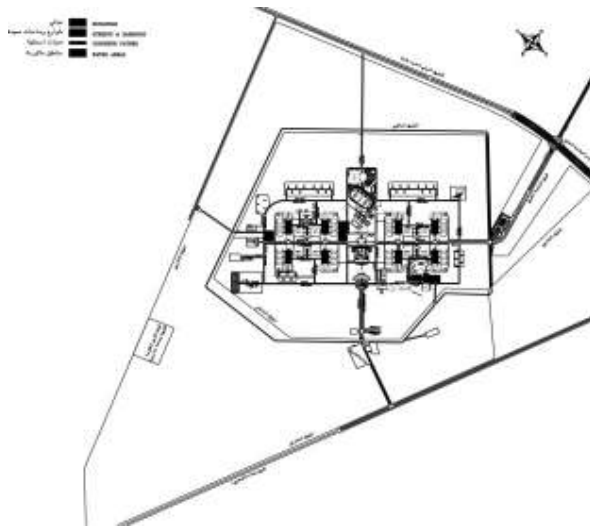
Fig. 1: The site plan of Al-Bayt University (2011)

academic year 2010-2011 is 10883 students, is facing a major problem in its open spaces in terms of design and use. The present situation, in terms of harsh climatic situation, especially during summer, in addition to its capacity, poor signage system and the absence of landmarks in the two main squares is adding up to the problem. This research assesses the quality of open space in the campus of the Al-Bayt University in 2011 focusing on the Kurish Square, which is in the heart of the science colleges and the Bani Hashim Square, which is in the center of the human colleges. Accordingly, this study focuses on the analysis of the activities that take place in these spaces as well as an analysis of outdoor-spatial layout components that might influence the perception, frequency of use, social interaction and vitality of open spaces in academic university settings.

LITERATURE REVIEW

Public space:
The scene: In The Social Logic of Space, Hillier and Hanson (1984) argued that human societies are spatial phenomena; they not only exist in space but take a spatial form as well. Space is a great void within which all things transpire. External perceptual space is defined as "a more or less discrete and delimited volume affording human occupation and movement therein" (Thiel, 1997). This space is bounded by a variety of elevations and cannot be treated separately from them, for it is "the clear legibility of its geometrical characteristics and aesthetic qualities which allows us consciously to consider external space as urban space."

Krier (1979). This leads us to the concept of urban space. According to Krier (1979) external urban space is defined as "all types of space between buildings in towns and other localities." Urban space is often associated with external space, which is open and unobtrusive of movement in the open air, with public, semipublic and private zones. Francis (1987) expands that definition to include "all publicly accessible open places designed and built for human activity and enjoyment." Closely related to the concept of urban space is the concept of public space. According to Kostof (1992) public spaces refer to "places we are all free to use, as against the privately owned houses and shops.". Also related to the concepts of public and urban space is the notion of public realm. It can be defined as "that shared space of the society, which brings people to gather together, to relate to one another and/or to be separate and that is assessable both socially and physically." Moule and Polyzoides (1994) As such, Thiel (1997) regarded the physical environment a "scene" that is made up of three components: space, which can be defined as a more or less discrete and delimited volume affording human occupation and movement therein; place, referring to the physical qualities of a space that gives it an identity and character; and occasion that is related to the presence of humans and human activity either implicitly or explicitly.

Open spaces are the foundation of natural system of any physical environment. Each open space has its own characteristics: Each has evolved from various factors, such as enclosure, which is determined by the architecture next to it. The volume of the space determines the characteristics of open space. The distance between the observer and the height of the surrounding architecture influences how these open spaces are perceived (Gibson, 1977). The physical features inside the open space are also as important as the space itself. Some spaces are famous because of special features, or because they are adjacent to an appealing scene, such as a waterfront or a green area overlooking a beautiful landscape (Wiseman, 1981). Barriers inside the open space control people's movement and direct way finding. Barriers can be symbolic or real. Symbolic barriers include plants, steps and signs, while real barriers include walls of buildings and free-standing walls (Rapoport, 1982). Enclosed open space, or open space without immediate view and access, can be constricting to interaction (Pyron, 1971). The identity of the open space is emphasized by the use of landmarks. People can remember a landmark, so they

remember the space more easily (Garling and Lindberg, 1986). In public open space the absence of landmarks disorients the user and gives no identity to the space, making it more difficult to remember the open space and to reuse it Mac Minner (1997). Landmarks are an important element in city and urban design. They give a meaning to the open space and people only remember those landmarks inside the open space (Lynch, 1981). Thiel (1997) summarized the above mentioned characteristics in a series of attributes through which place can be represented and identified. These include: explicitness, degree of enclosure, spatial form quality, space connection and spatial size, direction and proportion.

Activities in outdoor spaces: Gehl (1987) distinguished between three types of activities that take place in outdoor spaces: necessary/functional activities, optional/recreational activities and social activities. Functional activities are formal encounters which are needed to carry out common tasks and exchange information; while necessary activities, although affected by the quality of the physical setting, take place regardless due to its necessity, optional activities i.e., informal gatherings and encounters, depend to a significant degree on what the physical setting has to offer and how it makes people behave and feel about it. The better a setting, the more optional activity occurs. Social activity or human interaction is the consequence of the quality and duration of the other two activities, because it occurs spontaneously when people meet in a particular setting. Social activities include greetings and casual conversations, communal activities of various kinds and simply seeing and hearing other people. Communal spaces in cities and residential areas become meaningful and attractive when all activities of all types occur in combination and feed off each other. For Kostof (1992), public outdoor spaces provide for two aspects: encounter and ritual. Outdoor spaces provide familiar and chance encounters, in other words, we can meet friends in public places or we can act and interact with other 'strangers' i.e., optional and social activities. The second aspect is ritual in the sense that it has to do with hosting structured or communal activities such as festivals, meetings, rallies, etc., i.e., functional activities of a collective nature.

Research hypothesis: It is assumed that public spaces are designed with the intention of promoting human interaction. Some of these spaces can be considered a failure and others a success. Success is defined by Campbell and Campbell (1988) as the degree to which the public space is used as intended by the designer with
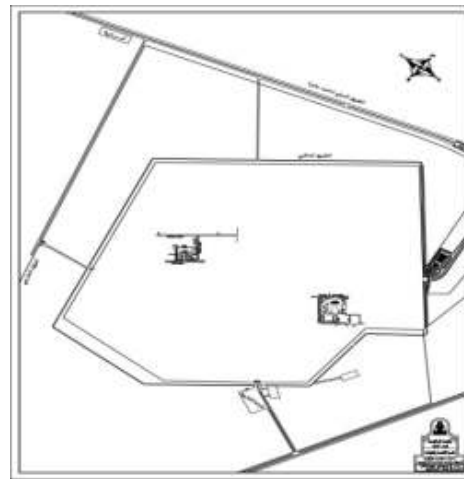

Fig. 2: Location of Kurish (left) and Bani Hashim (right) squares (Al-Bayt University, 2011)

Fig. 3: Kurish square

Fig. 4: Kurish different approaches

Fig. 5: Bani Hashim square (authors)

Fig. 6: Bani Hashim seats and plantation

regard to promoting interaction between faculty, students and staff. In this study, an evaluation of the present situation of open spaces at Al-Bayt University will be carried out. The study will be divided into several constituents; first, the design quality of the open space is analyzed. Second, a study of the landmarks inside the Kurish and Bani Hashim squares will be examined. A visual study of the spatial capacity of these open spaces will be studied with its three components, the spatial orientation, the spatial visualization and the spatial relations and a number of photographs will be analyzed.

Setting: The two case studies presented in this research are similar to many other contemporary open spaces, whether in Jordan, or any other country. As described above, we can find similar cases in other modern cities because modern open space is left over space in front of or among buildings. This research assesses the quality of open space in the campus of the Al-Bayt University in 2011 in general focusing on the Kurish Square, which is in the heart of the science colleges and the Bani Hashim Square, which is in the center of the human colleges.

The Kurish Square is an open space that is rectilinear enclosed by one main building, several pedestrian routes and a garden as in Fig. 2. It is used as a gathering point that is approached by several ways (Fig. 3). It contains little vegetation and soft landscape, several chairs, no canopies, a small fountain and lighting features. It is almost flat with some steps (Fig. 4). The physical features inside the open space are important as the space itself. Some spaces in the world are famous because of special features, or because they are adjacent to a nice scene such as water front or green area that overlooks a beautiful landscape. Despite the fact that there are several physical features inside the Kurish Square, their design and setting are poor and need restarting and rearranging to facilitate movement.

The Bani Hashim Square open space is different from the Kurish Square in that the students using it are from human specialties of the University. Its position within the central area of the human colleges and the larger number of students makes the number of its users much greater. As Fig. 5 shows, one main building and one garden is in front of it. It has a rectangular shape, surrounded by few steps (Fig. 6). There are several approaches to the Bani Hashim Square; the most familiar is the pedestrian route connecting the University's east to its west. The boundaries of the Bani Hashim Square are not appropriate where the garden next to it opens directly on the space. There is no landmark at all inside the square. The signage system is also minimal. Though there was luxuriant vegetation, it was adjacent to the Bani Hashim Square rather than a part of it.

METHODOLOGY

The research methodology depends on integrating both social and physical variables that are related to the use of public spaces. As such, three methods of research were used. The first method is behavioral observation in the two squares. The study was conducted in the second semester of the academic year 2010/2011, over a period of 1 week. The behavioral observations were carried out in three sessions following the students' academic schedule: the morning session between 8 and 10 AM and between 10 AM and 1 PM, the afternoon session between 1 and 2 PM and between 2 and 4 PM as shown in Table 1 and 2. The total number of students observed is 5220 and 9791 for Kurish and Bani Hashim squares, respectively. Four trained researchers, in addition to the authors have helped in behavior mapping at the selected setting. The observations that appear in Table 1 are developed according to the student's behavior recorded by the researchers. To further understand the results, nine subjects were interviewed. The second type of research method is a questionnaire used to interview students by the researchers. The sample for Kurish and Bani Hashim squares consisted of 160 and 195, respectively. They were selected randomly, with just about 50% male and the rest female over 1 week period. Students were from various university departments and faculties and were asked if they would like to participate in the study. Participants voluntarily agreed to the interview and to fill out the questionnaire presented in Table 3 and 4. To assess the hypotheses of the study, t-test, Chi-Square Test and ANOVA Test were performed as shown later. The

Table 1: Average daily activities observations for Kuraish and Bani Hashim squares

Activity	8-10 M B1	8-10 M B2	8-10 F B1	8-10 F B2	10-1 M B1	10-1 M B2	10-1 F B1	10-1 F B2	1-2 M B1	1-2 M B2	1-2 F B1	1-2 F B2	2-4 M B1	2-4 M B2	2-4 F B1	2-4 F B2
Sitting	37	34	50	68	56	86	84	98	30	60	48	78	14	30	12	26
Reading	4	12	5	14	7	28	12	38	4	20	52	9	2	30	2	4
Talking	5	13	7	14	7	17	12	32	21	25	32	34	2	9	2	12
Eating	2	3	3	6	3	7	6	12	4	14	6	26	1	3	1	7
Passing	44	7	22	50	32	56	38	64	84	112	81	102	26	62	18	39
Walking	10	22	12	31	14	29	10	22	16	36	10	26	7	16	4	10
Studying	2	6	3	13	2	5	2	13	5	10	4	12	0	1	0	1
Dating	2	5	13	8	2	4	2	8	1	1	1	2	5	12	4	14
Standing	17	28	12	18	16	24	5	14	22	52	14	40	6	18	10	15
Total	123	130	127	222	139	256	171	301	187	330	248	329	63	181	53	128
Grand total								2988								

B1: Kuraish building; B2: Bani-Hashem building

Table 2: Questionnaire for Kuraish and Bani-Hashem squares

Year			Mostly disagree B1	B2	Disagree B1	B2	Neutral B1	B2	Agree B1	B2	Mostly agree B1	B2	Total B1	B2
Q.1. Do you feel comfortable when you are inside the square?														
First	Gender	Male	0	1	1	10	0	5	0	5	0	2	1	23
		Female	0	3	2	4	0	13	0	13	0	7	2	40
Second	Gender	Male	0	1	6	6	1	3	3	3	0	3	10	16
		Female	5	1	16	1	9	11	2	11	0	4	32	28
Third	Gender	Male	0	2	9	1	9	4	6	4	0	7	24	18
		Female	3	2	10	7	10	7	9	7	0	2	32	25
Fourth	Gender	Male	3	2	10	1	6	8	10	8	1	2	30	21
		Female	8	4	9	4	8	6	4	6	0	4	29	24
	Total		19	16	63	34	43	57	34	57	1	31	160	195
Q. 2. Do you find shaded area to protect yourself?														
First	Gender	Male		4	1	9	0	8	0	5	0	0	1	26
		Female		8	2	17	0	6	0	1	0	0	2	32
Second	Gender	Male	1	9	6	9	2	1	1	3	0	0	10	22
		Female	11	9	15	11	3	1	3	3	0	1	32	25
Third	Gender	Male	7	8	10	10	3	2	4	3	0	2	24	25
		Female	16	9	11	2	3	6	2	3	0	2	32	22
Fourth	Gender	Male	18	6	7	5	2	6	1	1	2	1	30	19
		Female	19	14	5	3	2	2	3	3	0	2	29	24
	Total		72	67	57	66	15	32	14	22	2	8	160	195
Q. 3. Do you like to spend more time at this square?														
First	Gender	Male	0	7	0	8	1	7	0	3	0	1	1	26
		Female	0	7	0	9	1	14	1	2	0	0	2	32
Second	Gender	Male	1	3	4	12	3	4	2	1	0	2	10	22
		Female	3	5	10	7	9	10	7	3	3	0	32	25
Third	Gender	Male	1	4	7	12	14	3	2	4	0	2	24	25
		Female	2	2	16	8	10	5	3	6	1	1	32	22
Fourth	Gender	Male	5	2	11	6	9	4	4	3	1	3	30	18
		Female	6	4	11	4	7	7	3	9	2	0	29	24
	Total		18	34	59	66	54	54	22	31	7	9	160	194
Q. 4. Are you satisfied with existing green area?														
First	Gender	Male	0	1	1	11	0	6		6		2	1	26
		Female	0	6	0	12	2	9		2		3	2	32
Second	Gender	Male	1	4	1	6	4	3	3	3	1	6	10	22
		Female	7	0	10	5	7	10	5	7	3	3	32	25
Third	Gender	Male	0	3	6	4	13	3	5	11	0	4	24	25
		Female	3	9	9	2	12	1	6	4	2	6	32	22
Fourth	Gender	Male	3	0	8	0	9	4	7	6	3	8	30	18
		Female	10	5	1	3	7	2	8	10	3	4	29	24
	Total		24	28	36	43	54	38	34	49	12	36	160	194

Table 2: (Continue)

Q. 5. Are you satisfied with design of green are at this square?

First	Gender	Male	0	0	1	10	0	8	0	7	0	1	1	26
		Female	0	0	0	8	1	17	1	6	0	1	2	32
Second	Gender	Male	0	5	2	3	5	7	2	5	1	2	10	22
		Female	6	2	11	11	12	8	3	4	0	0	32	25
Third	Gender	Male	2	1	6	7	9	9	7	5	0	3	24	25
		Female	2	3	7	4	15	7	5	6	3	2	32	22
Fourth	Gender	Male	4	0	14	4	3	3	2	7	7	4	30	18
		Female	9	3	7	3	3	5	7	9	3	4	29	24
	Total		23	14	48	50	48	64	27	49	14	17	160	194

Q. 6. Are the existing trees sufficient?

First	Gender	Male	0	11	0	12	1	2	0	0	0	1	1	26
		Female	0	17	1	10	1	4	0	0	0	1	2	32
Second	Gender	Male	0	14	6	3	4	3	0	0	0	2	10	22
		Female	6	8	17	14	7	2	1	1	1	0	32	25
Third	Gender	Male	4	10	13	11	6	4	1	0	0	0	24	25
		Female	6	8	15	11	11	1	0	1	0	1	32	22
Fourth	Gender	Male	13	8	14	4	2	1	1	4	0	1	30	18
		Female	15	11	11	6	2	2	1	5	0	0	29	24
	Total		44	87	77	71	34	19	4	11	1	6	160	194

Q. 7. Are the existing seats sufficient?

First	Gender	Male	0	2	0	6	1	9	0	4	0	5	1	26
		Female	0	3	0	7	2	5	0	11	0	6	2	32
Second	Gender	Male	1	3	2	4	5	8	2	3	0	4	10	22
		Female	2	3	12	4	3	8	13	4	2	6	32	25
Third	Gender	Male	1	5	6	7	15	7	2	4	0	2	24	25
		Female	1	4	12	9	13	1	6	5	0	3	32	22
Fourth	Gender	Male	4	4	12	7	10	3	4	2	0	2	30	18
		Female	4	4	14	14	2	1	8	5	1	0	29	24
	Total		13	28	58	58	51	42	35	38	3	28	160	194

Q. 8. Do you feel comfortable with existing seats?

First	Gender	Male	0	2	0	8	1	11	0	5	0	0	1	26
		Female	0	2	0	13	1	10	0	7	1	0	2	32
Second	Gender	Male	1	7	3	1	5	10	0	3	1	1	10	22
		Female	3	1	7	8	5	8	8	8	9	0	32	25
Third	Gender	Male	2	7	7	7	11	4	4	5	0	2	24	25
		Female	1	5	16	8	6	3	7	5	2	1	32	22
Fourth	Gender	Male	5	2	8	3	8	7	8	5	1	1	30	18
		Female	5	5	13	10	7	3	4	6	0	0	29	24
	Total		17	31	54	58	44	56	31	44	14	5	160	194

Q. 9. Are you satisfied with existing fountains?

First	Gender	Male	0	10	0	12	0	3	0	1	0	0	0	26
		Female	0	13	0	14	0	4	1	1	1	0	2	32
Second	Gender	Male	3	12	2	8	0	0	3	2	1	0	9	22
		Female	10	12	5	10	4	3	3	0	2	0	24	25
Third	Gender	Male	3	11	4	13	4	1	9	0	10	0	30	25
		Female	6	15	3	5	4	0	12	1	4	1	29	22
Fourth	Gender	Male	8	11	5	3	3	3	7	1	7	0	30	18
		Female	16	19	5	4	2	1	6	0	7	0	36	24
	Total		46	103	24	69	17	15	41	6	32	1	160	194

Q. 10. Is the design of fountains good?

First	Gender	Male	0	7	0	11	0	5	1	3	0	0	1	26
		Female	0	9	1	7	1	11	0	4	0	1	2	32
Second	Gender	Male	1	8	1	7	5	3	3	2	0	2	10	22
		Female	4	9	7	7	12	4	6	4	3	1	32	25
Third	Gender	Male	1	4	11	10	6	7	6	4	0	0	24	25
		Female	3	13	12	4	8	4	9	1	0	0	32	22
Fourth	Gender	Male	4	8	2	4	12	2	12	3	0	1	30	18
		Female	6	9	7	7	4	3	12	5	0	0	29	24
	Total		19	67	41	57	48	39	49	26	3	5	160	194

third type of research method was to use the pictures of the Kurish and Bani Hashim Squares to analyze their quality, form, shape and other urban design elements.

RESULTS

Passing and sitting were the main two activities inside the Kurish square as seen from (Table 1), while at Bani Hashim, sitting, passing and standing are the most common (Table 2). This may be due to the nature of colleges adjacent to each square. Students of Kurish Square located next to science colleges, have little time due to their syllabus which is nearly full all day. Studying and reading as an activity is the least in both squares. Reading for females is common between 1 and 2 PM at Kurish square, which is a break time for the university. While reading for females between 10 AM and 1 PM at Bani Hashim Square as seen in Table 1. The average number of students observed daily for Kurish Square is 1105 students compared to 1935 students at Bani Hashim Square during the observation time. This is due mainly to the number of students in the human science colleges, who are twice the number of students at the science colleges.

The questionnaires in Table 2 were analyzed using t-test and ANOVA Test. The purpose of these questionnaires is to assess the design of the open space and its quality in both squares. The average is 2.57, with the interval between 1.33-2.66 considered weak, between 2.67-3.99 neutral and between 4.00-5.00 good for Table 3 and 4 (t-test). The total number of students that were questioned daily for one week is 160 students at Kurish Square and 195 students at Bani Hashim Square.

Both squares suffer from the inadequate shading devices and a low number of trees. The climate of Al-Mafraq is very hot during the summer, therefore it can be logically deduced that students suffer a lot in both open spaces, as is evident in Table 3 and 4. The lowest mean in Table 3 is for question number 2 which is about the availability of shading area, while in Table 4; the lowest mean is for question number nine, which is about the availability of a fountain for cooling the temperatures (which does not exist in Bani Hashim Square). A well designed water feature does exist at Kurish Square but sadly without water inside it, as seen in Table 3, question number 9, which has the highest mean in the questionnaire. Question number one, who is about feeling comfortable inside the open space, is weak for Kurish Square and neutral for Bani Hashim Square. The means are 2.59 for the first and 3.27 for the second. For Kurish Square the number of seats is not sufficient and less than that at Bani Hashim square, as evident from question number 7. Even the type of seats is not comfortable for students as seen from question number 8.

Table 3: T-test one-sample statistic for Kurish square

	N	Mean	S.D.	S.E. mean
q1	160	2.5938	0.97321	0.07694
q2	160	1.8563	0.99588	0.07873
q3	160	2.6313	1.00077	0.07912
q4	160	2.8375	1.14863	0.09081
q5	160	2.7563	1.15876	0.09161
q6	160	2.0063	0.80484	0.06363
q7	160	2.7313	0.95642	0.07561
q8	160	2.8188	1.13199	0.08949
q9	160	2.9313	1.53828	0.12161
q10	160	2.8500	1.04731	0.08280

Table 4: T-test one-sample statistic for Bani Hashim square

	N	Mean	S.D.	S.E. mean
q1	195	3.2718	1.16786	0.08363
q2	195	2.1692	1.14292	0.08185
q3	195	2.5590	1.09373	0.07832
q4	195	3.1231	1.34135	0.09606
q5	195	3.0308	1.07410	0.07692
q6	195	1.8615	1.01854	0.07294
q7	195	2.8974	1.28020	0.09168
q8	195	2.6615	1.07373	0.07689
q9	195	1.6205	0.79922	0.05723
q10	195	2.1949	1.13200	0.08106

Questions number 4, 5 and 6 are about the green area and its design and quality in the two open spaces. From Table 3 and 5 the means are between 2.00 and 2.83 for Kurish Square and between 1.86 and 3.12 for Bani Hashim Square. This indicates that all numbers are either weak or neutral. No good result exists in either table. This means that the overall design of two squares is not considered good and a major change to their design and components should take place to satisfy the users.

Another test was conducted to analyze the questionnaire in detail. The ANOVA Test is shown in Table 5 and each student year is presented. The largest number of students questioned is from the fourth year, then the third and second years. The lowest number is from the first year students, due mainly to their full time lectures. The highest number of means at Kurish Square is from first year students, which is 4.66, for question number 9 which is about the existing fountain. The lowest mean for the same question is 2.47 for the fourth year. This is due mainly to the long period that the students have been at the University and their disappointment about non-working fountain which is inoperable due to maintenance reasons. The lowest mean for the Kurish Square is 1.66 for the fourth year students for question number 6, which is about the amount of trees available at square for the same previous reason. The students waited for 4 years for the university to plant new trees, but without any result. Another low mean is 1.67 for the fourth students for question number two, which is about finding shaded areas for students. We can observe a high mean of 3.66

Table 5: One way ANOVA test for Kurish & Bani Hashim square

		N		Mean		S.D.		S.E.	
		B1	B2	B1	B2	B1	B2	B1	B2
q1	First	3	58	2.0000	3.2414	0.00000	1.18928	0.00000	0.15616
	Second	42	47	2.3571	3.3617	0.85029	1.05141	0.13120	0.15336
	Third	56	47	2.8214	3.2766	0.89660	1.21050	0.11981	0.17657
	Fourth	59	42	2.5763	3.2143	1.10178	1.25980	0.14344	0.19439
	Total	160	194	2.5938	3.2718	0.97321	1.16786	0.07694	0.08363
q2	First	3	58	2.0000	2.2414	0.00000	0.90438	0.00000	0.11875
	Second	42	47	2.0238	1.9787	0.89683	1.07318	0.13838	0.15654
	Third	56	47	1.9107	2.3191	0.97751	1.32051	0.13062	0.19262
	Fourth	59	42	1.6780	2.0952	1.08978	1.30308	0.14188	0.20107
	Total	160	194	1.8563	2.1692	0.99588	1.14292	0.07873	0.08185
q3	First	3	58	3.3333	2.3448	0.57735	1.00091	0.33333	0.13143
	Second	42	47	2.8333	2.4255	1.10247	1.01606	0.17012	0.14821
	Third	56	47	2.6071	2.6596	0.80178	1.14733	0.10714	0.16736
	Fourth	59	42	2.4746	2.9048	1.08843	1.18547	0.14170	0.18292
	Total	160	194	2.6313	2.5590	1.00077	1.09373	0.07912	0.07832
q4	First	3	58	2.6667	2.6724	0.57735	1.24690	0.33333	0.14837
	Second	42	47	2.7381	3.1915	1.25055	1.30182	0.19296	0.18157
	Third	56	47	2.8929	3.1064	0.90812	1.28717	0.12135	0.22399
	Fourth	59	42	2.8644	3.6429	1.30592	1.12515	0.17002	0.20110
	Total	160	194	2.8375	3.1231	1.14863	1.34135	0.09081	0.09606
q5	First	3	58	3.0000	2.9828	1.00000	0.82699	0.57735	0.10859
	Second	42	47	2.5714	2.6809	0.96633	1.08561	0.14911	0.15835
	Third	56	47	2.9464	3.0426	0.98016	1.12206	0.13098	0.16367
	Fourth	59	42	2.6949	3.4524	1.41731	1.19353	0.18452	0.18417
	Total	160	194	2.7563	3.0308	1.15876	1.07410	0.09161	0.07692
q6	First	3	58	2.6667	1.7241	0.57735	0.91370	0.33333	0.11997
	Second	42	47	2.2381	1.8085	0.82075	1.01378	0.12664	0.14788
	Third	56	47	2.1607	1.8298	0.73303	0.86776	0.09796	0.12658
	Fourth	59	42	1.6610	2.1190	0.75681	1.27265	0.09853	0.19637
	Total	160	194	2.0063	1.8615	0.80484	1.01854	0.06363	0.07294
q7	First	3	58	3.0000	3.2414	0.00000	1.24690	0.00000	0.16373
	Second	42	47	2.9762	3.1489	1.09295	1.30182	0.16865	0.18989
	Third	56	47	2.7500	2.6809	0.74468	1.28717	0.09951	0.18775
	Fourth	59	42	2.5254	2.3810	1.02311	1.12515	0.13320	0.17361
	Total	160	194	2.7313	2.8974	0.95642	1.28020	0.07561	0.09168
q8	First	3	58	3.6667	2.7069	1.15470	0.87877	0.66667	0.11539
	Second	42	47	3.2381	2.7447	1.32167	1.07275	0.20394	0.15648
	Third	56	47	2.7500	2.5106	0.95822	1.26615	0.12805	0.18469
	Fourth	59	42	2.5424	2.6667	1.05572	1.11894	0.13744	0.17266
	Total	160	194	2.8188	2.6615	1.13199	1.07373	0.08949	0.07689
q9	First	3	58	4.6667	1.7931	0.57735	0.78937	0.33333	0.10365
	Second	42	47	2.9286	1.6383	1.65858	0.79196	0.25592	0.11552
	Third	56	47	3.3214	1.5745	1.36325	0.82738	0.18217	0.12069
	Fourth	59	42	2.4746	1.4286	1.50122	0.76963	0.19544	0.11876
	Total	160	194	2.9313	1.6205	1.53828	0.79922	0.12161	0.05723
q10	First	3	58	3.0000	2.2931	1.00000	1.05977	0.57735	0.13915
	Second	42	47	2.9286	2.2340	1.09082	1.25478	0.16832	0.18303
	Third	56	47	2.7143	2.0851	0.94800	1.01788	0.12668	0.14847
	Fourth	59	42	2.9153	2.1667	1.11862	1.22806	0.14563	0.18949
	Total	160	194	2.8500	2.1949	1.04731	1.13200	0.08280	0.08106

		95% Confidence interval for mean							
		Lower bound		Upper bound		Min.		Max.	
		B1	B2	B1	B2	B1	B2	B1	B2
q1	First	2.0000	3.5541	2.0000	2.9287	2.00	1.00	2.00	5.00
	Second	2.0922	3.6704	2.6221	3.0530	1.00	1.00	4.00	5.00
	Third	2.5813	3.6320	3.0615	2.9212	1.00	1.00	4.00	5.00
	Fourth	2.2891	3.6069	2.8634	2.8217	1.00	1.00	5.00	5.00
	Total	2.4418	3.4367	2.7457	3.1069	1.00	1.00	5.00	5.00

Table 5: (Continue)

		95% Confidence interval for mean				Min.		Max.	
		Lower bound		Upper bound					
		B1	B2	B1	B2	B1	B2	B1	B2
q2	First	2.0000	2.4792	2.0000	2.0036	2.00	1.00	2.00	4.00
	Second	1.7443	2.2938	2.3033	1.6636	1.00	1.00	4.00	5.00
	Third	1.6489	2.7069	2.1725	1.9314	1.00	1.00	4.00	5.00
	Fourth	1.3940	2.5013	1.9620	1.6892	1.00	1.00	5.00	5.00
	Total	1.7008	2.3307	2.0117	2.0078	1.00	1.00	5.00	5.00
q3	First	1.8991	2.6080	4.7676	2.0817	3.00	1.00	4.00	5.00
	Second	2.4898	2.7239	3.1769	2.1272	1.00	1.00	5.00	5.00
	Third	2.3924	2.9964	2.8219	2.3227	1.00	1.00	5.00	5.00
	Fourth	2.1909	3.2742	2.7582	2.5353	1.00	1.00	5.00	5.00
	Total	2.4750	2.7134	2.7875	2.4045	1.00	1.00	5.00	5.00
q4	First	1.2324	2.9695	4.1009	2.3753	2.00	1.00	3.00	5.00
	Second	2.3484	3.5570	3.1278	2.8260	1.00	1.00	5.00	5.00
	Third	2.6497	3.5572	3.1361	2.6555	1.00	1.00	5.00	5.00
	Fourth	2.5241	4.0490	3.2047	3.2367	1.00	1.00	5.00	5.00
	Total	2.6582	3.3125	3.0168	2.9336	1.00	1.00	5.00	5.00
q5	First	0.5159	3.2002	5.4841	2.7653	2.00	2.00	4.00	5.00
	Second	2.2703	2.9996	2.8726	2.3621	1.00	1.00	5.00	5.00
	Third	2.6839	3.3720	3.2089	2.7131	1.00	1.00	5.00	5.00
	Fourth	2.3256	3.8243	3.0643	3.0805	1.00	1.00	5.00	5.00
	Total	2.5753	3.1825	2.9372	2.8791	1.00	1.00	5.00	5.00
q6	First	1.2324	1.9644	4.1009	1.4839	2.00	1.00	3.00	5.00
	Second	1.9823	2.1062	2.4939	1.5109	1.00	1.00	5.00	5.00
	Third	1.9644	2.0846	2.3570	1.5750	1.00	1.00	4.00	5.00
	Fourth	1.4638	2.5156	1.8582	1.7225	1.00	1.00	4.00	5.00
	Total	1.8806	2.0054	2.1319	1.7177	1.00	1.00	5.00	5.00
q7	First	3.0000	3.5692	3.0000	2.9135	3.00	1.00	3.00	5.00
	Second	2.6356	3.5312	3.3168	2.7667	1.00	1.00	5.00	5.00
	Third	2.5506	3.0588	2.9494	2.3029	1.00	1.00	4.00	5.00
	Fourth	2.2588	2.7316	2.7920	2.0303	1.00	1.00	5.00	5.00
	Total	2.5819	3.0782	2.8806	2.7166	1.00	1.00	5.00	5.00
q8	First	0.7982	2.9380	6.5351	2.4758	3.00	1.00	5.00	4.00
	Second	2.8262	3.0597	3.6500	2.4297	1.00	1.00	5.00	5.00
	Third	2.4934	2.8824	3.0066	2.1389	1.00	1.00	5.00	5.00
	Fourth	2.2672	3.0154	2.8175	2.3180	1.00	1.00	5.00	5.00
	Total	2.6420	2.8132	2.9955	2.5099	1.00	1.00	5.00	5.00
q9	First	3.2324	2.0007	6.1009	1.5855	4.00	1.00	5.00	4.00
	Second	2.4117	1.8708	3.4454	1.4058	1.00	1.00	5.00	4.00
	Third	2.9563	1.8174	3.6865	1.3315	1.00	1.00	5.00	5.00
	Fourth	2.0834	1.6684	2.8658	1.1887	1.00	1.00	5.00	4.00
	Total	2.6911	1.7334	3.1714	1.5076	1.00	1.00	5.00	5.00
q10	First	0.5159	2.5718	5.4841	2.0145	2.00	1.00	4.00	5.00
	Second	2.5886	2.6025	3.2685	1.8656	1.00	1.00	5.00	5.00
	Third	2.4604	2.3840	2.9682	1.7862	1.00	1.00	4.00	4.00
	Fourth	2.6237	2.5494	3.2068	1.7840	1.00	1.00	4.00	5.00
	Total	2.6865	2.3548	3.0135	2.0350	1.00	1.00	5.00	5.00

Min: Minimum; Max: Maximum

for the first year students for question number 8, which is about the quality of seats at the Kurish Square. This is due mainly to their first experience at the University. As their timing at the university lengthens, the number declines, reaching a low of 2.54. Question number four, which is about the existing green area in Kurish Square, has the closest means to each other in the whole questionnaire, with ranges from 2.66 to 2.89. This is mainly due to the green area in the square.

From Table 5, the ANOVA Test for Bani Hashim Square shows the highest mean from fourth year students for question number 4, which is 3.64. The question is about satisfaction with the green area. It looks like the fourth year students do not expect the university administration to make any change to the existing low area of greenery. The lowest mean is from fourth year students for question number nine, which is 1.42. The question is about the lack of a fountain. The

students are comparing themselves with students from Kurish Square and they would love to have a fountain like in that square. Question number one which is about feeling comfortable inside the Bani Hashim Square has also the closest means which range from 3.21 and 3.36.

DISCUSSION

From the results obtained earlier, the overall design of two squares is not considered suitable for promoting social interaction and a major change to their design and components should take place to satisfy users. Space perception is dependent on the distance between users and objects, the orientation and the movement of users in the space. The results support this assumption. Furthermore, scale plays a central role in the distinction between objects and environments; Ittelson (1973) added environmental space, which is based on the relationship between scale, space and people's experience can affect the positive perception of public space, since both Bani Hashim and Kurish Squares have a human scale; thus, there is no problem in the quality of approach to them and the results support the direct relationship between scale and positive perception.

Landmarks, stored in declarative knowledge structures, are memorable locations that help to orient navigators in public environments (Passini, 1984). As such, landmarks, which are missing in our two case studies, as well as the lack of structural framework and directional cues, increase the disorientation of students and hinder their ability to navigate and allocate their lecture halls. The results above confirm this assumption. This means that if a series of landmarks is constructed in the campus of the Al-Beit University and specifically in the Bani Hashim and Kuirsh Squares, a better route knowledge based on distance and orientation relationships can be obtained.

Furthermore, the results support the notion that the redesign of the boundaries and heights of the surroundings of the Bani Hashim and Kurish Squares, will improve the spatial environment of the two squares. The boundaries of the two squares are inconvenient as seen from Fig. 3 and 6. Symbolic and real barriers inside the open space, which control people's movement and direct way finding, include plants, steps and signs, walls of buildings and free-standing walls and should be incorporated in the future design. The research found the design of the steps of the Kurish Square to be suitable and aesthetically pleasant. Mostly students use them for sitting and resting, as there are few chairs in both squares. A redesign of the implementation of vegetation and its

position within the two squares will also improve the spatial environmental quality. The integration of plantation within the open space is the answer to improve spatial quality. A place has to be first recognized before a decision can be transformed into behavior.

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