



Archnet-IJAR: International Journal of Architectural Research
www.archnet-ijar.net/ -- <https://archnet.org/collections/34>

SCHOOLYARDS' DESIGN AND STUDENTS' NEEDS FROM GENDER PERSPECTIVE: THE CASE OF PALESTINE

DOI: <http://dx.doi.org/10.26687/archnet-ijar.v12i2.1521>

Manal Al-Bishawi*, Soheil Salaha, Shaden Awad

Keywords

Schoolyards; physical form components; students' needs, gender; Palestine.

ArchNet-IJAR is indexed and listed in several databases, including:

- Avery Index to Architectural Periodicals
- EBSCO-Current Abstracts-Art and Architecture
- CNKI: China National Knowledge Infrastructure
- DOAJ: Directory of Open Access Journals
- Pro-Quest
- Scopus-Elsevier
- Web of Science

Abstract

This study focuses on the relationship between gender, students' needs and the physical form of schoolyards. It investigates whether and how the needs of both male and female students influence the physical form of schoolyards in Palestine, as a Middle Eastern country. The aim is to develop a better theoretical understanding of the relationship between the students' needs based on their gender, and the physical form of schoolyards. The study follows an environmental approach, which is based on the concept of behavioural setting, to analyse the physical form of schoolyards in relation to students' needs. For the validity of results, both quantitative (questionnaire) and qualitative approaches (observations, interviews with planners, and school principals, mental maps drawn by students) are used. Different techniques, such as Statistical Package for Social Sciences (SPSS), ethnographic (cultural) techniques, photos and written notes are used. The study finds that the components of the physical form of schoolyards (design, use and rules) are influenced by gender, particularly the design components. There are differences between design, use and rules components of females' schoolyards and males' schoolyards. These differences are due to differences between needs of female and male students in schoolyards. Therefore, the study recommends that the components of schoolyards should support different needs of both male and female students.

M.Al-Bishawi*, S. Salha and S.Awad
Department of Architectural Engineering, Birzeit University, P.O.Box 14 Birzeit, Palestine.
Faculty of Educational Sciences, An-Najah University, Nablus, Palestine.
Department of Architectural Engineering, Birzeit University, P.O.Box 14 Birzeit, Palestine.

*Corresponding Author's email address: mbishawi@birzeit.edu

INTRODUCTION

In any society, people have specific needs and values that are influenced by their gender. These needs may be reflected in the physical form of the spaces they occupy, for example in the spaces' layout, furnishings, pavements and planting. Due to internationalization, research in the field of urban design including schoolyards' design is generally based on identifying standard human needs without considering properly the gender differences, which is a cultural variable.

Contemporary research and design works regarding schoolyards in general, and in the Middle East in particular, lack concentration on students' needs according to their gender. Although several studies have been conducted concerning schoolyards design and students' needs (educational, recreational and social), these studies have only focused on how students' standard needs influence the physical form of schoolyards. They did not take into consideration the role of the students' gender in influencing their needs, which differs from one cultural context to another. Thus, the existing theories concerning this topic seem inadequate for the purposes of this study, which is concerned with the relationship between the physical form of schoolyards and students' needs according to gender. In other words, in investigating the relationship between students' needs and the physical form of schoolyards, students' gender requires specific consideration.

During the twentieth century, the political and economic institutions of Palestinian cities, as in the rest of countries of the Middle East, underwent major transformations. Due to the impact of internationalization, there is a growing lack of awareness of cultural needs in urban design. In the West, industrialization and intellectual change led to gradual changes in urban design strategies and ways of using urban open spaces. In the Middle East on the other hand, these changes occurred later, particularly because of colonization after WWI. The emergent dominant powers, particularly Britain and France, demolished the existing structures of the defeated Ottoman ruling system. Systemic shifts involved all aspects of society: law, administration, education, and commerce. Even Western lifestyle and products started to be adopted by local societies (Al-Bishawi, 2008). Because of these changes, local architecture and urban design in Palestine experienced a big shift in two interrelated areas:

- Changes in the socio-cultural aspects of the societies, where new educational opportunities were offered, particularly to females who became a major user group of urban open spaces (Ahmed, 1992).
- Changes in planning practices, the decentralized planning process controlled by residents, which was governed by their needs and values, was transformed into a centralized process controlled by the municipalities and ministries according to functional needs, especially vehicle access.

The schoolyards are significant spaces where the impact of these changes is identified. The females became a major user group of schoolyards, which influenced the type and the manner of activities in schoolyards. In addition, the curriculum has been changed and new subjects were incorporated in the educational process, which influenced the use of schoolyards. Moreover, the schoolyards that were limited to pedestrians became accessible by cars.



Therefore, this study aims at investigating whether or not –and if so, how– students' needs according to gender influence the physical form of schoolyards in Palestine, as being a Middle Eastern country. This will contribute to the general knowledge concerning the design and development of schoolyards that support students' needs according to gender in general and in Palestine in particular. The study is following an environmental comprehensive approach, which allows investigating the students' needs in relation to the physical space's components: design, use and rules.

The study is composed of three main parts. The first part includes an introduction that explains briefly the educational system and the design of schoolyards in Palestine. The second part consists of a literature review concerning the human needs and gender issues in urban design focusing on the students' needs and gender differences in relation to schoolyards design and finally the third part includes the survey results and analysis of the schoolyards design in relation to needs and gender in Palestine.

Educational System in Palestine

Schools in Palestine, as in the rest of the Middle Eastern World, are categorized into three types based on gender: boys' schools, girls' schools, and educated (mixed) schools (Nicolai, 2007; the Palestinian Ministry of Education and Higher Education, 2000; Mustafa and Bisharat, 2008). In boys' schools, all the pupils and teachers are males, while in girls' schools, all pupils and teachers are females, and in the educated schools, the majority of pupils and staff, including the director, are males. In general, there are 2430 schools in Palestine. The girls' schools consist 837, while boys' schools consist 878, and the educated schools consist 288, which are either private schools or governmental schools. According to supervision and responsibility, the schools are distributed into 1833 schools supervised by the Palestinian government, 309 schools supervised by UNRWA and 288 schools supervised by private sectors (Affouneh, 2010). Generally, schools offer educations from grade 1 to 12 before joining the higher education at the universities.

In cities, males and females' schools offer education from grade 1 to 12, while in villages males' and females' schools usually offer educations from Grade 1 to 10 and educated schools offer education for grades 11 and 12. This is because many students, both males and females, leave schools early either for work or for marriage. This decreases the number of students who reach Grade 11 and 12, which does not allow the Ministry of Education and Higher Education (MOEHE) to establish separate males and females' schools.

The Palestinian educational system includes compulsory basic education that covers grades 1 to 10, and divided into the preparation stage (grades 1 to 4) and the empowerment stage (grades 5 to 10). Secondary education (general secondary education and a few vocational secondary schools) that covers grades 11 and 12. UNRWA schools offer grades 1 to 10 only and do not provide secondary education. Therefore, UNRWA students continue their secondary education in the governmental schools.

Regarding the Palestinian curriculum, boys and girls schools have almost the same curriculum. Only few differences exist formally in elective courses and informally in physical education courses. For example, in the elective courses and due to the formal instructions imposed by the MOEHE, girls' schools focus on economy and housekeeping courses. While



boys' schools focus on environment and health courses. Regarding the physical education courses, and due the society's traditions rather than formal instructions, girls' schools focus on volleyball and badminton, while boys 'schools focus on football and basketball¹.

Schoolyards' Design in Palestine

In Palestine, the MOEHE is responsible for designing the governmental schools according to standards and regulations mentioned in the manual for designing schools in Palestine (The Palestinian Ministry of Education and Higher Education, 2000). The focus is on the design of indoor spaces as classrooms and labs rather than outdoor spaces or schoolyards. However, nothing is mentioned about the physical form of schoolyards in the schools' design regulations. In general, the remaining area after determining the required area for classrooms and other indoor spaces is left for the schoolyards and later on the principals of the schools will be responsible for the design and the development of their schoolyards. In other situations, the construction of governmental schools is donated by independent organizations (donors), who may influence the design of schools and their yards².

Governmental schools are mostly located inside residential neighbourhoods to enable the majority of students, who are mainly from the middle and low classes, to reach their schools on foot. The typical structure of the governmental schools has a rectangular, or L-shape, and multi-floors with a main corridor that serves for the access of classrooms. The school building is located in the middle or the rear of the yard, depending on the shape of the location, and surrounded by a wall. The design of schoolyards is very basic and poor, and elements or components in these yards are different from one to another. For example, some of the schoolyards have plants and green areas while others do not. Even the type of plants differs from one school to another. As well, some of the schoolyards have seats and football or basketball playgrounds or volleyball; meanwhile others do not (Figure 1).



Figure 1: The typical structure of schools a) L-shape with the yard in front b) schools inside residential districts, the yard is surrounded by residential buildings (Source: Authors).

¹ Based on interviews with directors of the selected schools

² Based on interviews with architects and planners in the Palestinian ministry of Education and Higher Education

INDIVIDUALS' NEEDS AND GENDER ISSUES IN URBAN DESIGN

Gender is the "division of people into two categories, "men" and "women". Through interaction with caretakers, socialization in childhood, peer pressure in adolescence, and gendered work and family roles, women and men are socially constructed to be different in behavior, attitudes, and emotions. The gendered social order is based on and maintains these differences" (Borgatta and Montgomery, 2000, p.1057). Gender influences human needs and behavior in the built environment. Several studies conducted in this field showed that females have specific needs in urban spaces, which are different from males' needs and from one cultural context to another. The needs for safety, security, play areas for children and comfort are found to be important needs to be considered in designing outdoor spaces for women's use (Polk, 2003; Franck and Paxon, 1989; Mazingo, 1989; Bunston and Breton, 1992; Greed, 2005). Women use green spaces and parks for active sporting purposes (jogging and walking) more often than men do (KGST, 2004). Women generally spend more time in neighbourhood squares and parks than men (Tessin, 2005). This attributed to their child-minding role, desire for social contacts, pronounced interest in nature and greater health consciousness (Klaphake et al., 2005). Women and girls appreciate places with a high level of sensuous and atmospheric quality, including a great variety of vegetation, a choice of sunny and shady areas, and attractive park furniture (Paravicini et al., 2002). There are still considerable differences between males and females in practicing outdoor sports where boys prefer competitive games, and girls prefer movement games in small groups or pairs (Gender kompetenz zentrum, 2007). In addition, football play is still the majority practicing outdoor sport by males (Zinnecker et al., 2002).

Moreover, individuals' behaviour, perception of and attitudes towards their built environment are depending on their gender. Moore (1983) shows that different people interpret their physical environment differently, depending on their lifestyle, gender, age, and ethnicity. For example, the study has shown that men's image of the city is more composite whereas women's image is more detailed and they define a larger territory of their home area than men do. Women's specific need for privacy, particularly in their relations with the stranger males, in Arab-Muslim cities influenced women's behaviour and the physical form of outdoor spaces in traditional and modern Arab-Muslim cities. The height of the adjacent buildings and the placement of windows and doors; the rules governed timing for instance with regard to use of public baths; the transitional spaces; the device of screening; and the layout of houses, created the reality that women could use their own spaces without being violated by stranger males (Al-Bishawi, 2008; Kenzari and Elsheshtawy, 2003; Bianca, 2000; Ottoman, 1988; Abue-Lughod, 1987; Akber, 1986; Hakim, 1986).

Therefore, planners and architects should not treat females in the same way as males. Thus, the women's needs should be considered and reflected in the physical environment, including schoolyards, in accordance with cultural traits.

GENDER DIFFERENCES IN STUDENTS' NEEDS AND SCHOOLYARDS' DESIGN

Schoolyard is defined as "space outside the building or the school's external environment. A school's buildings and grounds are also part of the surrounding community and each has an impact on the other. An unimproved or degraded schoolyard sends a negative message

about the school and the neighbourhood in which it is situated. A dynamic and active schoolyard adds to the vibrancy of both. All schools have schoolyards, whether big or small, beautiful or ugly, actively used or abandoned. The question becomes, how do we develop this potential asset into a space that is put to its highest use?"(Education Development Center, Inc. and the Boston Schoolyard, 2000, p.1). Generally, the schoolyard should be designed to address three areas of activities (Education Development Center, Inc. and the Boston Schoolyard, 2000, p. 1):

- Recreation and physical education.
- Social development.
- Academic learning.

Outdoor learning should be linked to academic content: particularly a mix of outdoor instruction and indoor teaching leads to improved achievements. Several researches emphasized the importance of integrating outdoor learning into teaching through using the outdoors as both venue and content. For example, the schoolyard can provide avenue for activity (as in the case of going outside to read a story) or serve as the essential element of an activity (as in the case of going outside to find examples of geometric shapes in nature). Therefore, schoolyards must include spaces that could be used for breathing life into the concept learned in the classroom (Broda, 2011; Boston Schoolyard Initiative, 2011; Waite, 2011; Wagner & Gordon, 2010; Meyer, 2010; Bristol, 2008). In addition to academic learning, schoolyards should provide opportunities for the physical challenges, exercise, sports and unsupervised play, which allow for healthy development and connection with natural environment. Accordingly, schoolyards should be safe places where children practice social skills and explore the natural world (Danks, 2010). Providing porticos, plazas, courtyards, amphitheatres, pathways, creative water and turf play environment, outdoor learning spaces, and outdoor dining in schoolyards enhance the social and educational experience in these yards. The layout of the pathways and the landscape of the playground should show the distinct areas for the different age groups. The areas should be separated at least with a buffer zone, which could be an area of shrubs or benches (French et al., 2011). In planning and designing schoolyards, several factors should be considered such as environmental, health, and safety. The schoolyards should not be located near noise or pollution sources. The location of schoolyards should allow for safe arrival and departure of students from the school facility. The location should be safe from danger such as wells, unprotected edges, drop-offs and cliffs. The schoolyards should also include openings to storm sewer system (New Jersey Institute of Technology, 2007). Involvement of students, teachers, administrators and parents in the schoolyards planning process can help in providing sustainable and usable schoolyards (Boston Schoolyard Initiative, 2011).

Despite various studies discussed gender issues in schoolyards, these studies focused on the role of schools in influencing gender relationship rather than the role of gender in influencing schoolyards' design. For example, Boyel & Robeson (2003) explored the social interactions related to gender that take place at Schoolyards. Their results showed the ways in which children reinforce their gender identities; the wide intra-gender variability in choice of activities especially for girls; and clear evidence of border work, that is, those interactions where boys and girls play together, while the way they play actually reinforces the gender divisions rather than diminishes them. Thorne (1993) explained how schoolyards are spaces



where activities are very stereotype and traditional gender roles are reproduced. She clarified how the organization and meaning of gender are influenced by age, race, ethnicity and social class. A study conducted by Diketmueller (2007) explored the factors that influence the gender play at schoolyards in Austria. She found that teachers and educators play a main role in the process of gendering schoolyards. Arnesen (2004) investigate how the space influences gender relations between youth. For example, institutions and educational establishments are resistant to changes of gender relations.

In the Middle Eastern literature, there are no specific studies concerning schoolyards' design and how it should be related to the students' gender. Most of the studies focus on the design of the school building (building form and standards for classrooms and furniture) rather than the schoolyards' design (Palestinian Ministry of Education and Higher Education, 2000; Al-Soliman, 1996). In addition, there are few studies which focused on the school contextual factors that explain students' violence: how students' reports of violence are influenced by individual factors (gender, age, perception of school climate and intervention) and school contextual factors (cultural affiliation, SES of students' families, school and class size, school climate, intervention) (Kassabri et al, 2009). A study funded by the Aga Khan in 2012 focused on the learning environments of the Palestinian schools, the study found that the designs of the schoolyards is poor and there is a need to rethink schoolyards design considering that the school building and schoolyard is one entity and the design of schoolyard should be open-ended and changeable (Kotob, 2013). This study did not tackle the gender differences and schoolyards' design issue.

Although the previous studies maintained that schoolyards' design should fulfil students' needs which are related to curriculum (educational needs) and other social and recreational needs, which are not related to curriculum (non-educational needs), there are issues that have not been dealt with. On the one hand, the scholars of these studies talk about students' standard needs. They do not consider students' needs in relation to gender in schoolyard designs. On the other hand, the scholars of these studies do not consider cultural behaviour properly and limit themselves to specific cultures, particularly to Western cultures. For example, most of these studies have been developed and tested in Western settings, and are influenced only by Western values, which are in turn dependent on culture and local context. Thus, these theories cannot be applied universally, and studying similar aspects of schoolyards in non-Western context may reveal different situations and require reconsidering design criteria and concepts. Therefore, further studies should be conducted to investigate how students' needs in relation to gender influence the physical form of schoolyards.

METHODOLOGICAL APPROACH

In order to analyse the physical form of schoolyards in relation to students' needs, a comprehensive approach that allows for investigating students' needs in relation to space's components: design, use and rules, is used. For example, if the design elements of the schoolyards or the rules, which govern the use of these yards, do not provide students' needs, students will try to achieve their needs through behaviour (the activity and the way of doing the activity) (Al-Bishawi & Ghadban, 2011). According to this approach, students' needs consist of three main components, which are reflected in the physical form of schoolyards, as follows:



- Design components (physical components) that include the schoolyards where the students' activities occur; their boundaries, locations and elements.
- Use components (social components) that include students' activities in the schoolyards (curriculum and non-curriculum activities).
- Rules components (cultural components), which include both formal and informal rules that govern the physical form and the use of schoolyards. Formal rules include written rules that are concerned with the design and function of the schoolyards, such as written signs governing the users of the schoolyards and building codes and regulations. Informal rules include rules that govern students' behaviour, such as religious, society and schools' restrictions.

For this study, students' needs are classified into two groups (Figure 2):

- Educational needs: students' needs, which are relevant to curricular activities.
- Non-Educational: students' needs which are relevant to non-curricular activities.

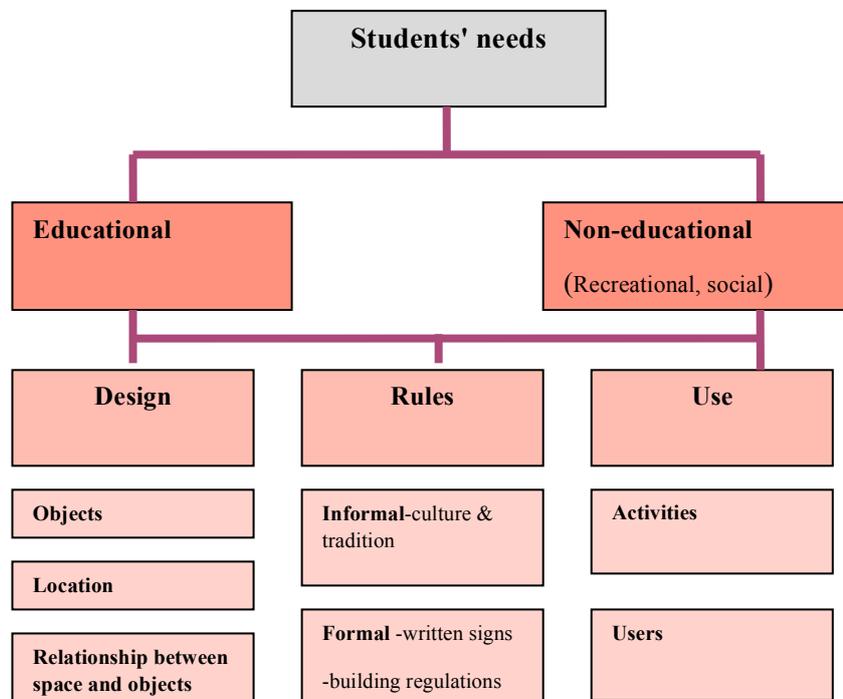


Figure 2. Conceptual drawing for data collection

To investigate the relationship between students' needs in relation to gender and the physical form of schoolyards, the study focuses on investigating different components of the physical form of the selected schoolyards and the needs to which these components are relevant.

Data Collection Methods

In order to gather the required data, observations, interviews, mental maps drawings and questionnaires were used, which provided the principal source of data.

Observations

Direct observations were carried out to examine how students' gender influences their needs. The observations were conducted by the researchers and another trained observer in different governmental secondary schools in the northern, middle and eastern parts of Palestine in both cities and villages. The observed students were both males and females in the grades 11 and 12, since gender differences appear clearly in this age of students in the Palestinian society. The observations started with conducting a field survey of different female, male and educated governmental secondary schools by the researchers. In each school, the observations covered design, use and rules components. The main technique used in these observations was to take photos and written notes. The collected data from the observations was categorized into three main groups according to the established component type (design, use and rules), and then were matched with the relevant students' need (educational and non-educational).

Interviews

Interviews were conducted with decision makers who are responsible for shaping the physical form of schoolyards. Mainly the planners and architects in the Palestinian Ministry of Education and Higher Education, who are responsible for design of schools and physical layouts of schoolyards in Palestine, and the principals of the selected schools, who are responsible for creation of many design elements and rules in schoolyards. These interviews were conducted for the following purposes:

- To increase the validity of the study as interviewees reflected the perspectives of people relevant to physical form of schoolyards and gender;
- To develop concepts related to gender differences in students' needs and to provide in depth explanations for the results.

The main objective of the interviews with planners and architects is to understand how planners and architects in MOEHE consider gender issues. Moreover, to understand the factors that influence the planners and architects in design and planning of schoolyards in general. The main objective of the interviews with principals is to understand how gender issues influence their decisions about the changes in the physical form of their schools yards. In addition, these interviews helped to understand how the curriculum is influenced by gender.

Mental maps drawings

The mental mapping method was conducted to explore gender differences in the students' perception of their schoolyards. In each selected school, ten male and ten female students were asked to draw how they would like to see their schoolyards. The drawings of male students were analysed to see the shared elements, which appear in these drawings. In a similar way, the drawings of female students were analysed. Then a comparison between the elements in each group was conducted to find out the gender differences.

Questionnaire

The questionnaire was conducted to examine the relationship between physical form of schoolyards and students' needs in relation to gender and how these needs are influenced

by the location of school (city and village). The main focus in the questionnaire was on students' opinion towards different needs' components in schoolyards, an element which cannot be ascertained from observations. The questionnaire consisted of two sections: the first section consisted of personal data about student gender, grade and school location. The second section consisted of 3 domains and 35 items to explore the relationship between students' needs and schoolyards' components in relation to gender. The three domains were as follows:

- Use of schoolyard for both curricular and non-curricular activities;
- Rules, which govern the use and the design of schoolyard;
- Design of schoolyard.

The questionnaire was distributed in the first scholastic semester in the year 2012– 2013. Every student was asked to fill the questionnaire. The researchers collected the questionnaires from each district in West Bank. In order to analyse the questionnaire results the following statistics were used:

- Frequencies and percentages to present study variables;
- Correlation coefficient to examine how the main components of schoolyards' physical form (design, use and rules) are relevant to gender;
- Chi-Square test is used to examine the relationship between the subcomponents of each main component (design, use and rules) and gender.

A total of 42,191 students at grades 11 & 12 in the governmental schools of West Bank, for the scholastic year 2012/ 2013 was chosen. Table 1 shows the distribution of the study population due to district, grade and gender variables.

Table 1: Distribution of the studied population due to district, grade and gender variables (Source: Authors).

District	Grade 11			Grade 12		
	Male	Female	Total	Male	Female	Total
Jenin	1,524	1,720	3,244	1,420	1,585	3,005
South of Nablus	736	999	1,735	697	935	1,632
Nablus	2,370	2,544	4,914	2,104	2,493	4,597
Salfit	684	741	1,425	621	739	1,360
Tulkarem	1,688	1,803	3,491	1,523	1,753	3,276
Qalqilia	931	1,000	1,931	903	1,014	1,917
Ramallah	2,540	3,145	5,685	2,268	2,976	5,244
Al-Quds Suburbs	751	979	1,730	593	843	1,436
Al-Quds	834	1,452	2,286	765	1,359	2,124
Bethlehem	1,659	1,993	3,652	1,476	1,865	3,341
Jericho	336	413	749	258	367	625
North of Hebron	1,472	1,620	3,092	1,303	1,567	2,870



Hebron	1,800	2,416	4,216	1,639	2,215	3,854
South of Hebron	1,864	2,303	4,167	1,688	2,121	3,809
Qabateih	1,104	1,243	2,347	955	1,103	2,058
Tubas	485	613	1,098	424	619	1,043
Total	20,778	24,984	45,762	18,637	23,554	42,191

A stratified random sample was chosen for the purpose of this study. The sample consisted of 1470 from the whole population, each district was presented proportionally to its size of students. Tables 2- 4 below indicate the sample distribution in accordance with the three independent variables: Gender, Grade and School location.

Table 2: Distribution of sample according to gender (Source: Authors).

Gender	Frequency	Percentage %
Male	758	51.6
Female	712	48.4
Total	1470	100%

Table 3: Distribution of sample according to grade (Source: Authors).

Grade	Frequency	Percentage %
11th grade	723	49.2
12th grade	747	50.8
Total	1470	100 %

Table 4: Distribution of sample according to school's location (Source: Authors).

School location	Frequency	Percentage %
City	453	30.8
Village	1017	69.2
Total	1470	100%

RESULTS

The implemented methods (observations, interviews, mental maps, and questionnaire) provided sufficient data regarding students' needs, particularly their interrelation to the three components of the schoolyard physical form (design, use, and rules).



Results of the Observations

Gender and design components of schoolyards

Results of the observations showed that girls' schoolyards are mainly located inside or close to the residential neighbourhood, meanwhile boys and educated schoolyards are mostly located outside the residential neighbourhoods. The gates of girls' schoolyards are less transparent than the gates of boys and educated schoolyards (Figure 3a, b). Walls usually surround boys, girls and educated schoolyards; however, walls are higher in the girls' schoolyards than in the boys and educated schoolyards (Figure 3c, d). There are differences between elements of boys, educated and girls' schoolyards. For example, boys and educated schoolyards are always provided with football playgrounds, while the girls' schoolyards are not. More colours are used in girls' schoolyards than in boys and educated schoolyards. Girls' schoolyards contain more seating and shading elements than boys' schoolyard. As well gardens and plants are more evident in girls' schoolyards than in boys and educated schoolyards (Figure 3e, f).

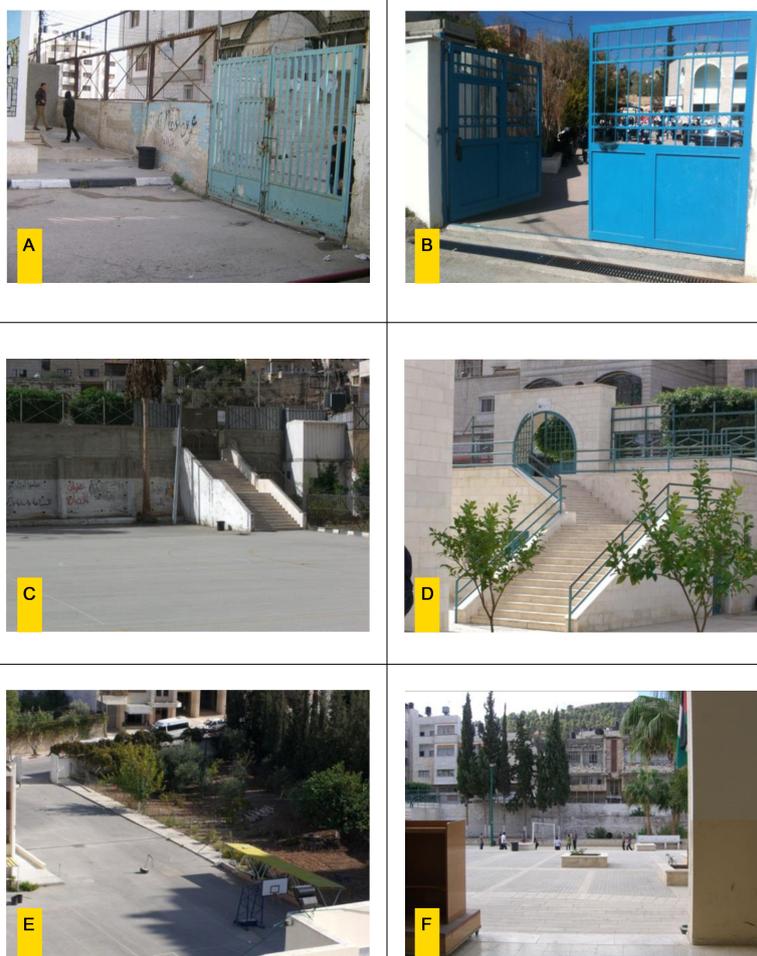


Figure 3: Observations concerning gender and design components (Source: Authors).

Gender and use components of schoolyards

Results of the observations showed that there are differences in the behaviour of male and female students in the schoolyards. For example, female use their yards for walking and sitting activities more than running and playing as males often do (Figure 4a, b). Male students use their schoolyards for curricular and cultural activities more than female students do (Figure 4c, d).



Figure 4: Observations concerning gender and use components (Source: Authors).

Gender and rules components of schoolyards

Results of the observations showed that a written sign is fixed above the gate of schoolyard to indicate whether it is a girls, boys, or educated school (Figure. 5a, b, c, d). Physical conditions of females' schoolyard are better than in males' schoolyards. Female students behave in their schoolyards more quietly than male students do in their schoolyards. In educated schools, mainly males (Figure 5d) use the yards. Maintenance and physical conditions of females' schoolyard are better than in males' and educated schoolyards.

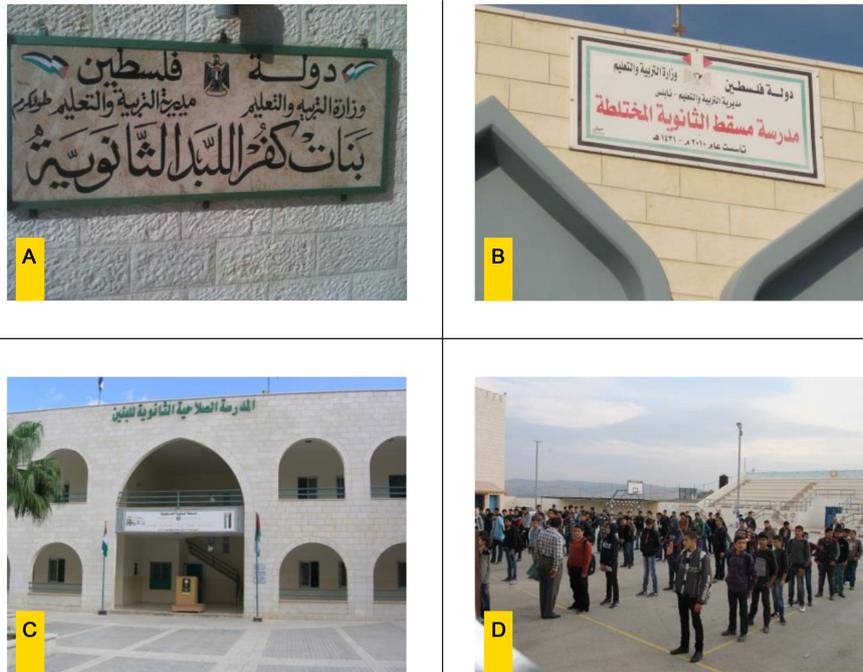


Figure 5: Observations concerning rules components relevant to gender (Source: Authors).

Based on the results of the observations, the physical form (design, use and rules components) of boys' schoolyards is different from physical form of girls' schoolyards, which indicates gender differences in the students' needs.

Results of the Interviews with Decision Makers

Interviews with planners and architects in the MOEHE showed that although nothing is mentioned about differences in design according to gender in the design regulations and codes, they consider the following measures when designing boys' and girls' schools:

- Location of girls' schools is mostly chosen close to residences and faraway from boys' schools;
- Girls' schools are always differentiated from male and educated schools using written signs above the main gates of schools;
- Surrounding walls in girls' schoolyards are higher than boys' and educated schoolyards;
- Gates of boys' and educated schoolyards are more transparent than gates of girls' schoolyards;
- Light colors are used in painting girls' schools, while dark colors are used in painting boys' and educated schoolyards.

Based on the above-mentioned results, it is found that the gender issues are considered informally (culturally) in the schoolyards' physical form.

Interviews with the principals of the selected schools showed that they are responsible for maintaining the physical form of schoolyards and providing design elements in schoolyards (seats, shading elements, plants, playing areas). The interviews results show the following:

- In girls' schools, the principals are females and usually focus on maintaining the physical form of the schoolyards more than in boys' and educated schools where the principals are males;
- In girls' schools, the principals focus on planting flowers and gardens, while in the males' and educated schools, the principals focus on planting long trees.

Based on the results, the female and male principals think about their schoolyards differently, which influences the physical form of the schoolyards.

Results of Mental Maps Drawings: Male's and Female's Perception of Schoolyards

The mental maps showed that there are more colours and details in the female students' drawings. In addition, badminton playground appears in most of females' drawings, meanwhile football playground appears in most of the males' drawings (Figure. 6 a, b, c, d).

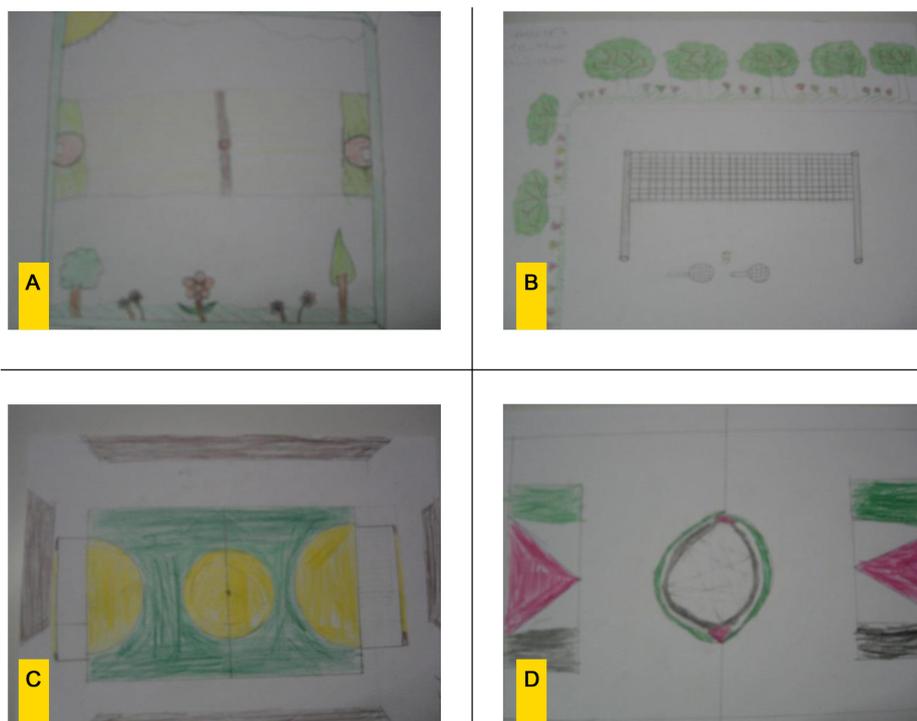


Figure 6: Mental maps drawings: a, b examples of mental maps drawn by female students, c, d examples of mental maps drawn by male students (Source: Authors).

Based on the above results, it seems that female students think about their schoolyards in a different way from male students, which indicates that female students' needs are different from male students' needs.



Results of the Questionnaire

The questionnaire results showed that there is a significant positive relationship between design components and gender and non-curricular components and gender (Table 5). Moreover, there is a significant negative relationship between use component and gender.

Table 5: The relationship between gender, design, use and rules in schoolyard (Source: Authors).

Schoolyard's component	gender
Design	*0.321
Rules	0.089
Use (curricular and non-curricular)	*0.058-
Curricular activities	0.092
Non curricular activities	*0.756

For in depth investigations, the relationship between the subcomponents of each main component (design, use and rules) and gender was tested using Chi-square as in Tables 6, 7, and 8. Table 6 below shows that differences between male and female schoolyards' design are mainly in plantings, playgrounds, shading elements, water sources, colours and location of schoolyards as follows:

- Plantings: male students prefer to have long trees in their yards more than female students.
- Playgrounds: male students are more concerned about playgrounds in their schoolyards. They prefer to have football playground in their schoolyards meanwhile female students prefer to have badminton playground in their schoolyards.
- Shading elements: male students do not care about shading elements in their schoolyards more than female students.
- Water elements: female students care about water elements in their schoolyards more than male students.
- Colors: female students prefer to have light colors in their schoolyards more than male students.
- Location of schoolyards: female students prefer to have their schoolyards far away from the streets more than male students.

Regarding the relation between the use components and gender, Table 7.1 shows the relation between the curriculum activities and gender. The results revealed that males and females realized their schoolyards differently, which indicates that male and female students use their schoolyards for curriculum activities in different ways. Table 7.2 shows that less females find their schoolyards not suitable for practicing group activities compared to males, while it is clear that females see their schoolyards are not suitable for open day activities compared to males.



Table 6: The relation between design components of schoolyards and gender (Source: Authors).

Gender Design components	Male		Female		Chi-Square	Sig.
	Yes	No	Yes	No		
Location of schoolyards is suitable for conducting different activities	529	229	475	237	1.604	0.205
Schoolyard is easily accessible from different parts of the school	494	264	435	277	2.623	0.105
I would like to have long trees	591	167	521	191	4.580	*0.032
I prefer to have schoolyard close to toilets	577	181	546	166	0.065	0.799
I prefer to have playgrounds as main elements	580	178	431	281	43.676	*0.0001
I prefer to have water elements	637	121	641	71	11.605	*0.001
I prefer to have shading elements	672	86	657	55	5.551	*0.018
I would like to have sitting elements	693	65	663	49	1.471	0.225
I would like to have areas for playing	676	82	625	87	0.708	0.400
I would like to have volley ball playground	623	135	567	145	1.555	0.212
I would like to have football playground	671	87	524	188	53.791	*0.0001
I would like to have badminton playground	474	284	591	121	77.092	*0.0001
I would like to have light colours	565	193	625	87	41.755	*0.0001
I prefer my schoolyard to be opened to the street	332	426	232	480	19.529	*0.0001
I would like to have closed areas	631	127	593	119	0.001	0.983



Table 7: The relation between use components of schoolyards and gender (Source: Authors).

Gender	Male		Female		Chi-Square	Sig.
	Yes	No	Yes	No		
Use components						
7.1: curricular activities and gender						
School yard is suitable to practice P.E activities	562	196	510	202	1.175	0.153
School yard is suitable for agricultural activities	303	455	349	363	12.165	*0.0001
School yard is suitable for home economy and exhibitions.	224	534	365	347	72.077	*0.0001
School yard is suitable to practice scientific practices	300	458	215	497	14.196	*0.0001
School yard is suitable to practice art activities	283	475	310	402	5.872	*0.015
Gender	Male		Female		Chi-Square	Sig.
Use components	Yes	No	Yes	No		
7.2: non-curricular activities and gender						
Schoolyard makes it easy to practice individual activities as picnic and individual games.	503	255	499	213	2.348	0.125
Schoolyard makes it possible to practice group activities as games.	586	172	587	125	6.005	*0.014
Schoolyard is a suitable place to socialize.	595	163	560	152	0.005	0.942
Schoolyard is a suitable place for morning queue.	623	135	591	121	0.170	0.680
Schoolyard is a suitable place for open day activities.	607	151	534	178	5.452	*0.020
Schoolyard is suitable to lodge national and religious activities.	579	179	528	184	0.980	0.322



Table 8 shows that restrictions on females' use of their schoolyards are more than on males' use of their schoolyards, particularly concerning P.E activities and using specific areas of the schoolyards.

Table 8: The relation between rules components of schoolyards and gender (Source: Authors).

Gender	Male		Female		Chi-Square	Sig.
	Yes	No	Yes	No		
The head of the school restricts the use of the yard by students	563	195	465	247	14.034	*0.0001
The students are not allowed to reach specific areas in the yard	398	360	476	236	31.351	*0.0001
I can't practice specific activities in the yard because of our norms and traditions	306	452	371	341	20.358	*0.0001
I can't practice specific activities in the yard because it is violated by neighbours	289	469	356	356	21.018	*0.0001
I am ordered to be quiet while using the yard	82	276	394	316	10.381	*0.001
I prefer to stay inside the class room more than going to the yard	297	461	245	467	3.592	0.058
The yard is always clean	469	289	489	223	7.493	*0.006
The yard and its elements are always well maintained	374	384	338	374	0.513	0.474
I am not allowed to practice P.E activities in the yard	329	429	271	441	4.337	*0.037

Table 9 explains the relationship between schoolyards' components, gender and location. It shows that relationship between design components of schoolyards and gender is not influenced by location (city, village), meanwhile there are negative significant relationships between use and rules components in the village.



Table 9: The relation between gender, location, design, use and rules in schoolyard (Source: Authors).

Schoolyard's component	gender	
	city	village
Design	0.079	0.002
Rules	0.059	*0.092-
Use(curricular and non- curricular)	the activities practiced by males0.050	*0.105- the activities practiced by males
Curricular activities	0.005	*0.137-
Non curricular activities	0.072	0.041-

DISCUSSION

In general, the results of this study showed that the components of the physical form of schoolyards (design, use and rules) are influenced by gender. Results of the observations revealed that the components of the physical form in males' schoolyards are different from females' schoolyards (Figures 3, 4, 5). In addition, results of the questionnaire showed that there is a relationship between design, use and rules components of the physical form of schoolyards and the gender differences, which means that all the components, particularly the design components, are relevant to gender (Tables 5, 6, 7, 8). The fact that gender issues are relevant to the physical form of schoolyards is influenced by the gender differences in needs between students (based on Greed, 2005; Polk,2003;Bunston and Breton,1992; Franck and Paxon,1989; Mozingo,1989), taking into consideration the interrelation between components of the needs and schoolyards' physical form (Al-Bishawi&Ghadban, 2011).

The results also showed that the components of the schoolyards are influenced by gender in different levels. For example, design components are more relevant to gender than use components, and both of them are more relevant to gender than the rules components (Table 5). This can be explained in light of the interrelation between the components of the students' needs (educational and non-educational) and the components of the physical form of schoolyards. For example, students' needs can be achieved through one of these components, or two of them, or all of them. Observations and interviews with principals showed that when design components of a schoolyard do not comply with a certain educational or non-educational need, the students would either avoid using the schoolyard for the activities related to this need or would try to adapt themselves in order to cope with the situation. This will affect the quality of their learning environment negatively. However, when design components comply with gender differences in the students' needs, both male and female students will have equal access to their schoolyards and will be able to use their yards comfortably and without restrictions. The design components significant relation to gender is related to the role of design in fulfilling the students' needs (Table 5). In addition, design components are more relevant to gender than other components due to differences in the way male and female students perceive their schoolyards (Moore, 1983). These differences between male and female students in perceiving the design components are



realized clearly in the questionnaire results (Table 6), the mental maps (Figure 6) and the observations (Figure 3). The results also showed that there is no significant relationship between the use components and gender (Table 5). This indicates that schoolyards do not match with the use of both male and female students, particularly concerning the curricular activities (educational needs). The rules components are less relevant to gender than design components (Table 5). This result is due to the nature of the rules as being social restrictions imposed on students' behaviour and subject to change. For example, when the rules change due to any reason the students' behaviour will accordingly change.

Regarding gender differences in the students' educational needs and the physical form of schoolyards, the results of this study showed that the relationship between gender and curricular activities, which reflect the educational needs, is not significant (Table 5). The reason for these results is the Palestinian fixed curriculum. Based on the interviews with schools' principals, the curricular activities are fixed and cannot be adjusted to fit the gender differences, except physical education and elective courses. However, deep analyses of the results showed that there are design, use and rules components of the physical form of schoolyards, which are influenced by gender differences. Results of the observations and the mental maps revealed that football playground is more relevant to males' schoolyards than females' schoolyards; meanwhile badminton playground is more relevant to females' schoolyards than males' schoolyards (Figure 6b, 6c). These results are related to gender differences in the curriculum concerning physical education. Based on the interviews with principals, girls' schools focus on volleyball and badminton, while boys' schools focus on football due to informal rules related to social traditions, rather than formal instructions from MOEHE. These informal rules concerning gender and sport practices influenced the curricular activities concerning physical education and caused the football playground to be a main design component of males' schoolyard while badminton playground to be a main design component of females' schoolyards.

In addition, results of the observations and the questionnaire showed that male students use their schoolyards for curricular activities more often than female students (Table 7.1, Figure 4). Although the reason for these results could be because design components of schoolyards do not comply enough with females' needs, these results are also related to gender differences in the curriculum, particularly concerning the elective courses. The interviews with principals showed that elective courses for girls are in economy and housekeeping, which require indoor spaces, while elective courses for boys are in environment and agriculture, which require outdoor spaces. However, the interviewed principals explained that girls' schools focus on economy and housekeeping courses due to the formal rules imposed on the curriculum by the MOEHE.

Regarding gender differences in the students' non-educational needs and physical form of schoolyards, results of this study showed that the relationship between gender and non-curricular activities, which reflect non-educational needs, is significant (Table 5). This indicates that there is an influence of gender on fulfilling these needs. These results are related to the importance of non-educational needs as they reflect the social and cultural life of students. Therefore, the rules, which govern these needs, are mainly informal rules. Results of the observations showed how students behave informally to achieve these needs and the interviews with principals of schools and planners in the MOEHE revealed how they informally consider these needs in their decisions about schoolyards. In general, the results

showed that design, use and rules components of the physical form of schoolyards are influenced by gender differences in the non-curricular activities (social and recreational).

Considering the design components, results of observations revealed that design components of females' schoolyards (location, walls, and gates) made them more isolated from the surrounding environment than the males' schoolyards (Figure 3). The observations showed that females usually use the shaded and covered areas or areas near walls for the non-curricular activities, while males practice non-curricular activities in open areas inside schoolyards (Figure 4a, 4b). In addition, formal and informal rules restrict the access to females' schoolyards more than males' schoolyards (Figure 5). These results are related to the cultural need for females' privacy, which is based on the culture of gender separation in Islamic culture which is dominant in Palestine and other Middle-Eastern contexts (based on Al-Bishawi, 2008; Kenzari and Elsheshtawy, 2003; Abu-Lughod, 1987; Hakim, 1986; Akber, 1986). This need caused the separation between males and females in schools and influenced different components of schoolyards' physical form in boys and girls schools. Interviews with principals and planners showed that choosing the location of females' schools close to residential neighbourhoods and faraway from males' schools as much as possible, increasing the height of surrounding walls and decreasing the transparency of gates in females' schoolyards are affecting the females' exposure to surrounding environment. Using the covered and shaded areas in schoolyards also contribute to females' protection from the surrounding environment. The written signs, which are fixed above the gates of schools control visitors' access to these schools. For example, female visitors do not need permission to enter the girls' schools, while male visitors do and vice versa³. The principals and planners confirmed this during the interviews. In addition, results of the questionnaire showed that female students do not prefer to have playgrounds in their schoolyards and do not like to have their schoolyards opened to the streets as male students do (Table 6).

Results of the observations showed that female students use their schoolyards for sitting, walking and gathering activities more than playing activities as male students do (Figure 4a, 4b). This was reflected in the design components of schoolyards where shaded and sitting elements were more often created in females' schoolyards than in males' schoolyards (Figure 3e, 3f). Also, the mental maps showed that the female students focused on green areas and plants and male students focused on playgrounds which reflects the difference in perception of the schoolyards between them (Figure 6a, 6b). These results concerning the differences in the perception between males and females can be seen as related to gender differences in their social needs, particularly concerning socialization and comfort (KGSt, 2004; Tessin, 2005; Klaphake et al., 2005).

Regarding informal rules, gender differences in students' needs and physical form of schoolyards, although planners and principals of schools consider students' needs according to gender informally, results of this study showed that these needs are met partially in schoolyards. This influenced negatively the use, the aesthetic quality, the connotation and

³ Based on the knowledge of researchers of the local context.



integrity of schoolyards. Results of observations and interviews showed that in the schoolyards which do not comply with females' privacy need, female students are obliged to wear their veils during physical education courses or are not allowed to reach specific areas of the schoolyards which are in visual contact with the neighbouring buildings. In addition, in the case of educated schools, male students mainly use the schoolyards for curricular and non-curricular activities. Meanwhile, female students stay inside classrooms and are deprived from their right to use their schoolyards, which influence the quality of education in these schools and contradicts with principles of democracy and equity between males and females in using schoolyards (Aslaksen et al, 1997). In addition, the observations and interviews showed that in many cases the height of walls surrounding the schoolyards, particularly in female schools, has been increased by using metallic or textile materials to fit the females' privacy need, which caused degradation in the aesthetic quality of these schoolyards.

Observations and interviews with principals of selected schools showed that gender influenced their decisions about physical form of schoolyards in different ways depending on their preferences rather than students' preferences, which influenced the connotation and integrity of schoolyards. Therefore, the physical form of females' schoolyards differs from one school to another, particularly concerning elements of the schoolyards (plantings, seats, shading elements, playing areas...etc.). Also, in some cases, gender influence was not considered in the physical form of schoolyards, which influenced negatively students' use of schoolyards. This was evident in the negative relationship between use components and gender (Table 5).

Regarding the location of schoolyards and students' needs, results of this study showed that design components of schoolyards and gender are not influenced by location (city, village) (Table 9). This indicates that design components are similarly relevant to gender in both villages and cities. The results also showed that there are no significant relationship between use and rules components in the village. Based on observations and interviews with principals, these results are related to the location of schoolyards in villages, where the schoolyards are located faraway from houses, mainly at the entrances of villages or along the main streets. Therefore, the schoolyards are not exposed to the surroundings, which allow female students to use their schoolyards more comfortably than female students in cities where apartment buildings and houses surround schoolyards.

CONCLUSION

This study provides us with important findings to answer the major question of this research concerning the relationship between gender, students' needs and physical form of schoolyards in Palestine, as being a Middle Eastern country.

Most scholars who investigated the relationship between students' needs and the physical of schoolyards in different contexts do not explain how students' needs influence the physical form of schoolyards based on gender. The scholars focus on students' needs in general, both educational and non-educational needs, and how these needs influence the physical form of schoolyards without considering gender issues (Waite, 2011; Wagner & Gordon, 2010; Danks, 2010; New Jersey School Outdoor Area Working Group, 2007). The result of this study showed that there is a relationship between gender, students' needs and physical



form of schoolyards. The results showed that gender influenced different components of schoolyards' physical form, which are interrelated with components of both educational and non-educational needs of students.

There are differences between design, use and rules components of females' schoolyards and those of males' schoolyards. These differences are due to differences between the needs of female and male students in schoolyards. Therefore, components of schoolyards should support different needs of both male and female students.

Male and female students and principals think differently about their schoolyards. As well, male and female students use their schoolyards differently. This means that planners should not treat females' schoolyards in the same way as males' schoolyards, in order to make sure that the females' needs are considered and reflected in the physical environment of their schoolyards.

Gender issues indirectly influenced the decision-making process concerning schoolyards' design. Results of this study showed that the students' needs according to gender are met partially and differently in schoolyards. This influenced the aesthetic quality, the connotation of the schoolyards, and caused an ineffective use of schoolyards. Including gender issues in the formal rules, which govern the design and development of schoolyards in Middle-Eastern cities, can help in providing schoolyards that meet needs of both male and female students and improving learning environment.

Results of this study showed that components of the physical form of schoolyards (design, use and rules) are influenced by gender. Results of the observations showed that there are differences between components of the physical form of male's schoolyards and the physical form of females' schoolyards (Figures 3, 4, 5). In addition, results of the questionnaire showed that there is a relationship between design, use and rules components of schoolyards and gender indicating that all the components, particularly the design components, are relevant to gender (tables, 6, 7, 8). The fact that gender issues are relevant to the physical form of schoolyards is seen as related to differences between the needs of male and female students (based on Greed, 2005; Polk, 2003; Bunston and Breton, 1992; Franck and Paxon, 1989; Mozingo, 1989), taking into consideration the interrelation between components of the needs and schoolyards' physical form (Al-Bishawi & Ghadban, 2011).

ACKNOWLEDGEMENT

This research has been funded by the Scientific Research Committee at Birzeit University, many thanks to this committee for providing the required funding.

REFERENCES

- Abu-Lughod, J. (1987). The Islamic city: Historic Myth, Islamic essence and contemporary relevance. *Middle East Study*, 19, 155-176.
- Affouneh, S. (2010). Towards the development of Palestinian Education Quality, a report issued in cooperation with public administration for governmental performance assurance in Palestine (in Arabic).

- Ahmed, L. (1992). *Women and Gender in Islam; historical Roots of a Modern Debate*. New Haven and London: Yale University Press.
- Akber, J. (1988). *Crisis in the Built Environment: The Case of the Muslim City*. Singapore: Concept Media.
- Al-Bishawi, M. & Al-Ghadban, S. (2011). Methodological Approach for Reading Urban Open Space. *Archnet-IJAR: International Journal of Architectural Research*, 5(1), 73-85.
- Al-Bishawi, M. (2008). *Women's Behavior in Public Space and the Influence of Privacy/ the Case of Nablus/ Palestine*, PH.D. Thesis, Norway- University of Life Sciences- Department of Spatial Planning and Landscape Architecture.
- Al-Soliman, T.M. (1996). The Effect of School Size Upon Educational and Environmental Factors, *JAPR*.
- Arnesen, K. & Laegren, A. (2004). Playing gender in public and community spaces. *Norsk Geogr. Tidsskrift*, 57(3), 164- 172.
- Aslaksen, F., Bergh, S., Bringa, O. R., & Heggem, E. K. (1997). *Universal Design, Planning and Design for All*. Oslo: The Norwegian State Council on Disability.
- Bianca, S. (2000). *Urban Form in the Arab World: Past and Present*. London: Thames & Hudson
- Borgatta, E.F. & Montgomery, R.J.V. (2000). *Encyclopedia of Sociology* (2nd ed., Vol. 2). New York: Macmillan Reference.
- Boston Schoolyard Initiative. (2011). Design Workbook and Planning Workbook.
- Boyle, M. & Robeson. (2003). Gender at Play: Fourth-Grade Girls and Boys on the Playground. *American Behavioral Scientist*, 46 (10), 1326-1345.
- Bristol. (2008). Reimagining Outdoor Learning Spaces: Primary Capital, Co-Design and Educational Transformation, Futurelab at NFER
- Broda, H. (2011). *Moving the Classroom Outdoors: Schoolyard-Enhanced Learning in Action*, Portland: Stenhouse Publishers.
- Bunston, T., & Breton, M. (1992). Homes and homeless Women. *Journal of Environmental Psychology*, 12, 149-162
- Danks, S. (2010). *Asphalt to Ecosystems: Design Ideas for Schoolyard Transformation*, New Village Press.
- Diketmueller, R. (2007). Physical Activities in Schoolyards-A New Occasion for Gender Debate in School, *12th Annual Congress of the ECSS*, 11–14, Jyväskylä, Finland.
- Education Development Center, Inc. and the Boston Schoolyard (2000). *Schoolyard Learning: The Impact of School Grounds, Boston Schoolyard Funders Collaborative*. White paper. Available at: <http://www.schoolyards.org/pdf/Schoolyard%20Learning-The%20impact%20of%20School%20Grounds.pdf>. Access Date, 18/2/2018.
- Franck, K. A. & Paxson, L. (1989). Women and Urban Public Spaces; Research, Design, and Policy Issues, In: Zube, E. and Moore, G. (eds), *Advances in Environment, Behavior and Design*, (p.122-146), New York: Plenum.
- French, J. & Contag, D. & Sundharam, P. (2011). Natural Environment Elevates the Learning Experience, *LandscapeOnline*
- Gender Competence at the Humboldt University of Berlin. (2007). *Aspects sports*, (online) Available at: www.genderkompetenz.info/genderkompetenz/sachgebiete/sport/aspekte/
- Greed, C. (2005). An Investigation of the Effectiveness of Gender Mainstreaming as a Means of Integrating the Needs of Women and Men into Spatial Planning in the United Kingdom. *Progress in Planning*, 64, 243-321.
- Hakim, B. S. (1986). *Arabic –Islamic Cities: Building and Planning Principles*. London: Kegan Paul International Limited.



- Kassabri, M. & Astor, R. & Benbenishty, R. (2009). Middle Eastern Adolescents' Perpetration of School Violence Against Peers and Teachers\ A Cross-Cultural and Ecological Analysis, *Journal of Interpersonal Violence*, 24, 159-182.
- Kenzari, B., & ElSheshtawy, Y. (2003). The Ambiguous Veil on Transparency, the Mashrabiya, and Architecture, *Architectural Education*, 65(4), 17-25.
- KGST: Local community agency for administrative simplification in cooperation with the Galke. (2004). Nation-wide internet survey to measure citizens' satisfaction with local green space, the final report, Cologne, Standing Conference of the garden officer at the German Cities. Available at: [www.galk.de/arbeitskreise/ak_orga_betriebswirt/ down / kgst_buergerumfrage_041027.pdf](http://www.galk.de/arbeitskreise/ak_orga_betriebswirt/down/kgst_buergerumfrage_041027.pdf)
- Klaphake, A. & Mahlke, M. & Pieschel, U. & Schroeder, T. (2005). *Citizens survey to prepare the landscape of ideas and design competition for the park on the triangle track, Berlin*. Final Report.
- Kotob, J. *Three Learning Environments in Palestine* (online). Available: <http://web.mit.edu/akpia/www/travelkotob.pdf>. Access Date, 10/6/2018.
- Meyer, K. (2010). *The Outdoor Classroom: A Jewel in the Crown of Public Education*. Design Share, Minneapolis, MN.
- Moore, G. (1983). Knowing About Environmental Knowing: The Current State of Theory and Research on Environmental Cognition. In: Pipkin, J., La Gory, M. & Blau, J (eds), *Remaking the City* (p.21-50). Albany-State University of New York Press.
- Mozingo, L. (1989). *Women and Downtown Open Spaces* (Vol.6), Available at: <http://repositories.cdlib.org/ced/places/vol6/iss1/LouiseMozingo>, Access Date, 18/9/2017.
- Mustafa, M. M. and Bisharat, K. (2008). "Palestinian National Authority". In: Mullis, I., Martin, M., Olson, J., Berger, D., Milne, D. and Stanco, G. (eds), *TIMSS 2007 Encyclopedia: A Guide to Mathematics and Science Education Around the World, Volume 2*, Boston: TIMSS & PIRLS International Study Center.
- Nicolai, S. (2007). *Fragmented Foundations: Education and Chronic Crisis in the Occupied Palestinian Territory*, Paris: UNESCO International Institute for Educational Planning and Save the Children UK.
- New Jersey Institute of Technology. (2007). *Schoolyard Planning and Design in New Jersey Enhancing Outdoor Play and Learning*, Center for Architecture and Building Science Research, New Jersey School Outdoor Area Working Group.
- Ottoman, M. (1988). *The Islamic City* (in Arabic: Al- Madinah Al- Islamiyyah). Al-Kuwait: Al-Majles al-Watani le-Athaqafahwal-Funoonwal-Adab.
- Palestinian Ministry of Education and Higher Education. (2000). *Future Schools in Palestine, A manual for Designing Schools*, Ramallah, The Ministry of Education.
- Paravicini, U., Claus, S., Munkel, A. & Oertzen, S. (2002). *Redesign of public spaces*. Research Report, Hanover
- Polk, M. (2003). Are Women Potentially More Accommodating than Men to a Sustainable Transportation System in Sweden? *Transportation Research*, D(8), 75-95.
- Thorne, B. (1993). *Gender play: girls and boys in school*. Buckingham: University Press.
- Tessin, W. (2005). Stadtteilplätze im Urteil von Nutzern und Nicht-Nutzern. *Stadt + Grün*, 1, 18–23
- Wagner, C.I. & Gordon, D. (2010). *Planning School Grounds for Outdoor Learning*, National Clearinghouse for Educational Facilities, Washington, DC.
- Waite, S. (2011). *Children Learning Outside the Classroom: From Birth to Eleven*, Sage Publications
- Zinnecker, J., Behnken, I., Maschke, P.P., Stecher, L. (2002). *Die erste Jugendgeneration des neuen Jahrhunderts* [The first generation of the young ones in the new century], Opladen.