URBAN SPACE DESIGN TO ENHANCE PHYSICAL ACTIVITIES AND MOTIVATE HEALTHY SOCIAL BEHAVIOR IN CAIRO, EGYPT

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Abstract

Physical activity is an essential component of any strategy that aims to seriously address the problems of sedentary living among people. The way we design the urban environment and provide access to the natural environment can be a great encouragement or a great barrier to physical activity and active living.

The aim of this paper is to discuss urban design guidelines in Cairo, Egypt that promote the physical activity of users and to motivate and change social behavior towards healthy living by offering possibilities and opportunities in urban green spaces in the city fabric.

A site analysis will be made of a selective urban space in Zahraa Elmaadi in Cairo. This is an example of a neglected green space in the urban fabric with existing negative social behavior and an unhealthy way of living. The analysis will be followed by future recommendations and proposed developments to increase users' interaction and healthy behavior.

Keywords: Physical activity, social interaction, urban identity, urban health, Zahraa Elmaadi**,** active city.

1 INTRODUCTION

Urban spaces are an important determinant of physical activity and behavior. They can provide opportunities that support physical activity or create barriers that prevent it. Over the past 60 years the proliferation of private car ownership has led to lower-density land use and a decline in incidental daily physical activity. Several sources have suggested that green spaces can have potential economic benefits for an area, especially in towns and cities. These benefits include improved public health, urban regeneration and increased economic investment (CABE, 2004), (Green Space Scotland, 2008).

Between 2000 and 2050 the proportion of people living in urban areas is projected to rise from 46.6% to 69.6% (United Nations, 2007). Increased urbanization poses problems through environmental pollution, traffic accidents, heat island effects and climate change (Frumkin, 2002), (McMichael, 2000). This has flagged up the need for multisectoral action to promote health in urban populations and has led to the rise of the 'Healthy Cities' movement (Kickbusch, 1989), (Flynn, 1996).

However there are good opportunities for the community to contribute to creating a healthy and sustainable environment that will encourage residents to adopt a healthier lifestyle. Both international and national research supports the fact that changing the living environment – especially through urban green spaces - affects people's living habits.

2 DEFINITION AND LITERATURE REVIEW

As mentioned in the introduction, a lack of physical activity in urban environments is becoming a threat to public health. This paper will not further explain the biological impacts but will instead focus more deeply on motivation and behavioral change.

2.1 Physical Activity

Physical activity is defined as any type of movement that increases energy expenditure (City of Perth, 2014). It is one of the eleven objective domains created by the Swedish National Institute of Public Health in order to improve public health (Linell et all, 2010).

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Research in the area of exercise today shows that performing small doses of physical activity throughout the day can achieve similar results to the more traditional approach of a tough daily workout session (Saelens, 2003). This research broadens the appeal and the accessibility of exercise, enabling people to perform physical activities knowing the exercise matters.

2.2 Factors Affecting Physical Activity

The social environment includes several dimensions that are known to influence participation in physical activity, including socioeconomic status and equity. Socioeconomic status tends to be inversely related to participation in leisure-time physical activity. This may be related to people with low incomes having less discretionary time and less access to exercise facilities and green spaces (McNeill, 2006). Culture also influences attitudes and beliefs about who should be active and the types of physical activity that are appropriate for different sexes, ages and groups. People are more likely to be active when they have the social support and encouragement of family, friends, co-workers and others (Sallis, 1999).

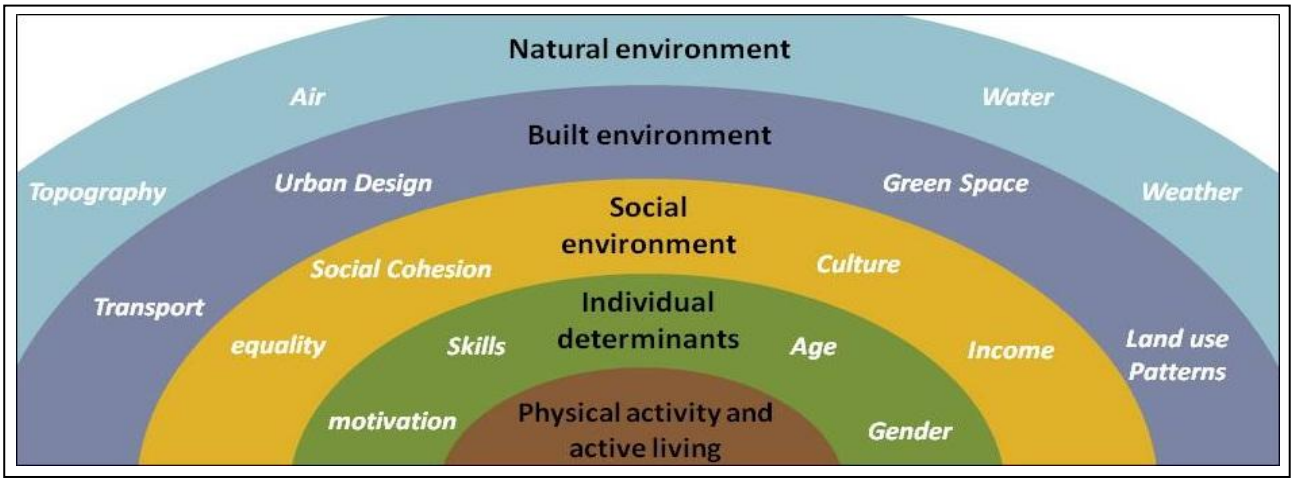

Fig. 1. Factors Affecting Physical Activity in the Community (Dahlgren, 1995)

According to Schafer (Schafer Elinder & Faskunger, 2006), the factors affecting motivation to physical activities can be listed as followed:

- ***P**hysical factors.- **E**conomic factors.- **P**olicies.- **S**ocial and cultural factors.*

2.2.1 Physical factors

The physical factors focused on the space design. For example, it is good to have safe and attractive residential urban space that are central and accessible along with green spaces that have the potential to adapt to free forms of activities.

2.2.2 Economic factors

Economic factors can be used to increase physical activity, by allowing people to use parks and sport clubs with a reduced membership, investing in the renovation of playgrounds in public spaces.

2.2.3 Policies

Adapting more laws is another approach that positively affects people's physical activity, such as rules regarding commercial sponsoring of youth sport and longer breaks during school time for children.

2.2.4 Social and cultural factors

Culture and society have a major effect on any space used to practice any kind of physical activities. The more the space was located in a small, closed community the more people will engage and practice sport freely.

2.3 Why Do We Need Design Guidelines / Development Form?

History has shown that the design of urban spaces can play a crucial role in improving public health. Today architects, urban designers and planners can help address one of the most urgent and widespread epidemics of our time. Meanwhile, the design of urban spaces in Egypt has to take into account the great

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demand to support active physical activity and the positive behavior of users. Spaces should be designed for both recreation and healthy living.

3 URBAN SPACE IDENTITY AND THE SUPPORTING ENVIRONMENT

The design of a city determines how its residents use it. Urban designers and architects can foster physical activity by designing spaces and streets that encourage walking, cycling, and other forms of active transport and recreation.

According to Gehl (Gehl, 1971), functional activities have to take place no matter what the environment looks like. Recreational activities have a lot to do with the physical environment, including the effect of how people feel about the space. A good place means more recreational activities take place and this also results in longer visits for both functional and recreational activities.

3.1 Creating an Active City

A recent study funded by the Robert Wood Johnson Foundation's Active Living Research Program developed several urban design metrics that eventually may be used to help explain differential rates of walking and physical activity (Boutelle, 2001), (Kerr, 2004). The study found five design qualities to be critical to a good walking environment. These characteristics were defined qualitatively and then related to the physical features of the street environment:

Imageability is the quality of a place that makes it distinct, recognizable, and memorable. A place has high imageability when specific physical elements and their arrangement capture attention, evoke feelings and create a lasting impression.

Enclosure refers to the degree to which streets and other public spaces are visually defined by buildings, walls, trees and other vertical elements.

Human scale refers to a size, texture, and articulation of physical elements that match the size and proportions of humans and equally important, correspond to the speed at which humans walk.

Transparency refers to the degree to which people can see or perceive objects and activity—especially human activity—beyond the edge of a street.

Complexity refers to the visual richness of a place. The complexity of a place depends on the variety of the physical environment.

Color-coded activity space in a schoolyard (Farley, 2007)

Greenford Country Park, West London (www.Landarch.com)

Fig. 2. Urban space examples as a positive value to promote physical activity

Opening schoolyards and providing a safety attendant during after-school and weekend hours have been shown to increase children's physical activity. Fig. 2 is a good example of visual richness and well-defined outdoor space

3.2 Benefits of Green Spaces

Over the last 20 years, fewer people have been visiting the countryside and urban green spaces such as

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parks and allotments. There is also pressure in urban areas from developments and construction projects. However, it is increasingly recognized that outdoor and natural environments can have health benefits. There is also a growing evidence base from a range of disciplines on the positive health impacts – both mental and physical – of contact with natural environments.

Green spaces have a role to play in improving wellbeing and treating mental ill health. Physical activity has been shown to improve outcomes in the treatment of mental illness and to improve wellbeing (Lancet, 2009).

3.3 Challenges and Opportunities in the Built Environment

Design elements in the built environment such as street layout, land use, the transport system and the location of recreation facilities, parks and public buildings are all components of a community that can either encourage or discourage active living. They are critical to addressing the challenges planners and elected officials face.

3.3.1 Urban sprawl and growing dependence on cars

Growing dependence on cars is both a cause and result of suburbanization. Many citizens and politicians are aware of the problems associated with urban sprawl. From a public health viewpoint, these problems include increased air pollution, noise, traffic congestion and road injury risk, increased greenhouse gases and reduced access to pleasant green spaces (Mobility in cities, 2005), (Dora, 2000).

Crowded city centers and the resurgence of urban living may make finding room for green spaces difficult especially in older, established cities. For example, the proportion of the population within 15 minutes of a green space by walking is only 56% in Bologna, 40% in Bratislava and 36% in Warsaw (Urban audit, 2006).

3.3.2 Residents' resistance to change

Well-meant plans to enhance active living may meet with resistance from residents if they do not perceive an overall benefit or if they link active living to lower prestige. In some settings, cycling or taking public transport to work may be seen as a sign of lower status because affluent people typically drive to work (Zimring, 2005).

3.4 Aspects of Urban Development Form

Urban design objectives are, by themselves, abstract. They have an impact on people's lives only by being translated into development. The form of buildings, structures and spaces is the physical expression of urban design. It is what influences the pattern of use, activity and movement in a place and the experiences of those who visit, live or work there.

This paper will sets out the most important characteristics of the physical form of development by articulating six aspects derived from several sources (DETR, 1998), (Tibbalds, 1995), (Shores, 2008). Together, these define the overall layout of the urban place. See Fig. 3

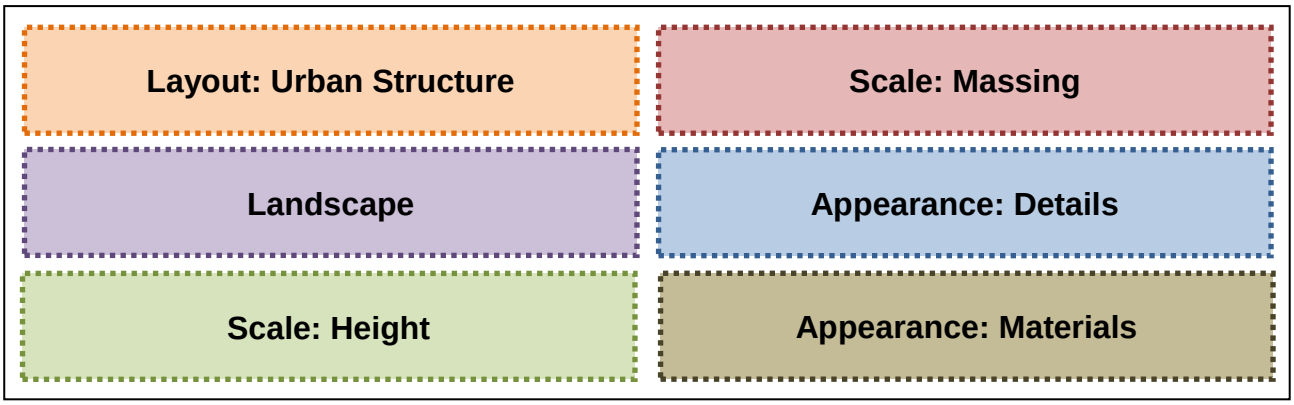

Fig. 3. Different Aspects of Urban Development Form (Adapted by the researcher)

4 SOCIAL AND URBAN ENVIRONMENT

For city planners, efforts to promote health through increased physical activity are inextricably tied to issues of social and racial equity. When racial and class tensions persist, greater compactness and connected built environments may be perceived as a threat (Vojnovic, 2006). When it comes to the urban structure of a site,

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the public space can be inviting and accessible, thereby encouraging residents and activities to move from the private to the public environment (Gehl, 2006). Conversely, public space can be designed in such a way that it is harder to achieve this, both physically and mentally.

Fig. 4 shows links between the social and urban environment and how it is vital to enhance and satisfy both in any proposed design of space in order to achieve the target positivity in both people's interaction and their physical activity.

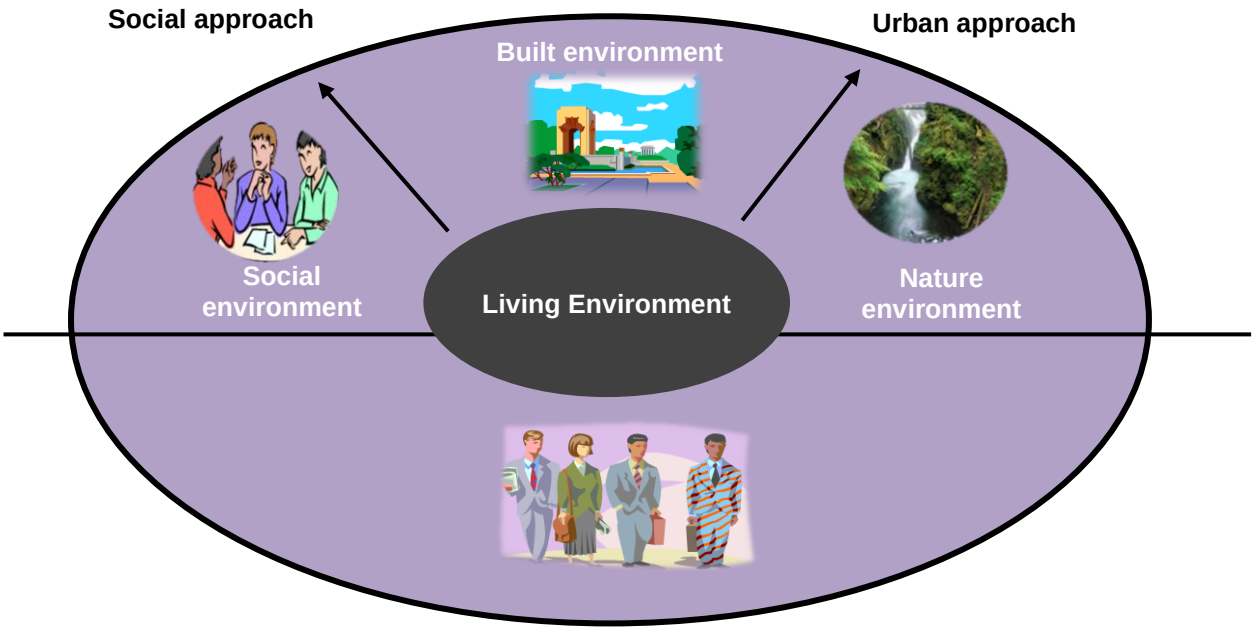

Fig. 4. Social and Urban Approach for Space Design (The Researcher)

4.1 Behavior Change and Motivation

Physical prerequisites have a big impact regarding changing behavior. The easier it is to perform a deed, the bigger its influence in people's behavior (Carlsson, 2001). Besides physical prerequisites Carlson recommends legislation and social norms as possible ways to change people's behavior. Without regulation, people have no incentive to change their behavior. By introducing mandatory measures such as physical barriers, it may be possible to change behavior in everyday life. Social norms mean "rules" and obligations that citizens follow even though they are not legislated.

Most of the research in this area shows that many people have an inaccurate perception of their behavior regarding physical activity, thinking they live healthily when in fact they don't. Improved motivation is a strong force according to Faskunger (Faskunger, 2013), but only for a limited time. Therefore increased motivation isn't the solution for long-term behavioral changes towards a more physically active life. Changing this behavior takes longer than most public health programs are scheduled for today.

4.2 Urban space and identity

According to Khan (Khan, 2009), any urban space can have multiple functions and meanings depending on the situation, each of which allows a variety of relations. Most people experience it in an individual way and there are many different uses of the same space happening simultaneously. As a result the urban space will always be just a vision for most people performing physical activity in it. Khan argues that place and identity are created at the same time.

The individually experienced space is already determined by what activities and identities it was intended for and therefore it favors some people more than others. An important aspect of shared space is diversity and therefore shared space must be accessible and welcoming for everyone. Especially since a lot of sports can be performed spontaneously by both individuals and groups.

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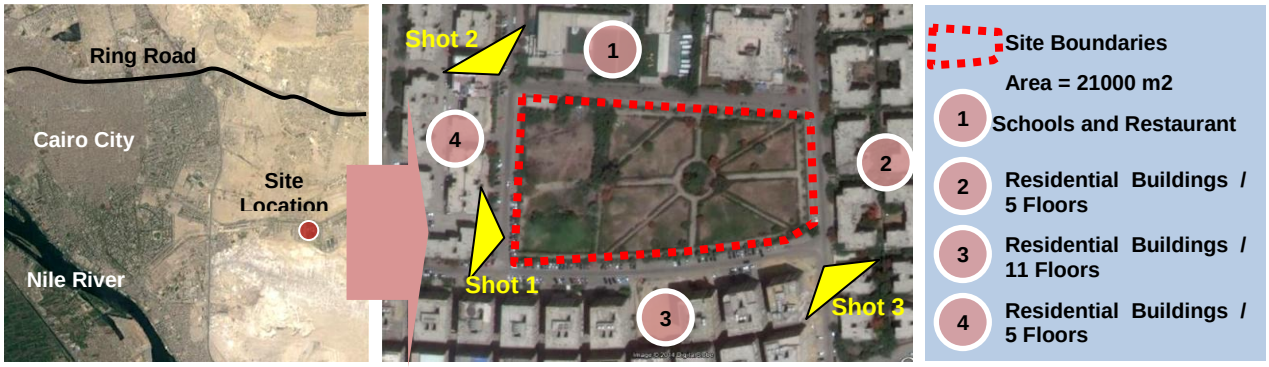
5 CASE STUDY

The selected case study in this paper is an urban space located in a housing area in Zahraa Elmaadi in Cairo, Egypt. A new design will be created to the area in order to investigate the potential of the space.

5.1 Location And Surroundings

Fig. 5 shows the location of this space, starting with its connection to the main ring road in Cairo. The surrounding land-use includes housing and educational buildings. The site is surrounded by local roads and is located in the heart of vibrant housing area on three sides. The fourth, northern, side is the location of schools and a two-floor restaurant. Accessibility and visual approach for the space is very high from all different sides, with surrounding building standing between two to eleven floors high.



Location, land use and total area of the space

Panoramic pictures of the space

Fig. 5. Location and Panoramic Pictures of Selected Urban Space in Zahraa Elmaadi (Google Earth, pictures by the researcher, 29/9/2014)

5.2 Existing Condition

Currently this space lacks maintenance, although it has a large area of greenery with great potential to attract local residents interaction. Fig. 6 shows different areas in the space, pictures were taken from 4 to 5

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pm.

Fig. 6. Lack of Maintenance in the Urban Space (The Researcher)

5.3 Findings From Site Visits

From regular visits to the site location, distributed between work and vacation days, mornings and afternoons – no need for night visits as the site lacks the lighting elements - some important findings can be listed:

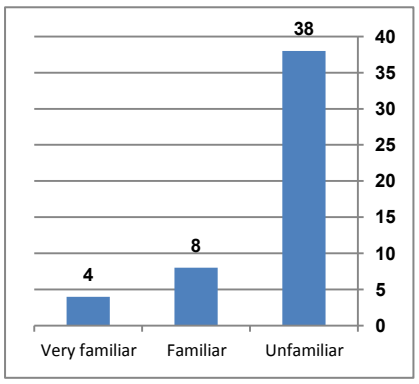
- The edges surrounding the space are used as vertical car-parking spaces.
- Some edges of the space are covered with plants and encourage a lot of negative activity.
- There is no diversity or opportunity for different types of users in the space design, only a green area and scattered trees with no overall vision.

5.4 Findings From Interviews

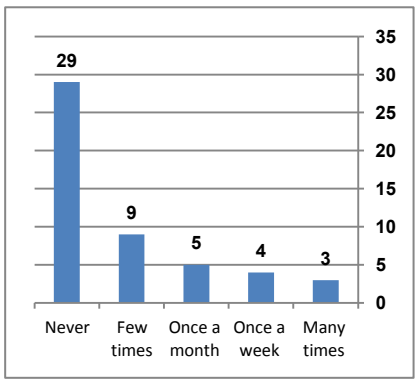
As Mitra and Lankford suggest (Lankford, 2009), it is important to understand the objectives of the procedures before designing the research instrument. The objectives of this procedure were:

1. To provide baseline information regarding factors that influence whether people do or do not use the space.
2. To explore the nature and scope of people's needs and preferred activities, related to the use of the space.
3. To explore the desired types of physical activity from the people living around the space.

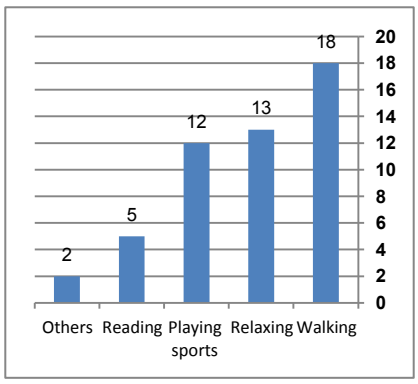
Data was obtained using questionnaires. The questionnaire method was chosen because it provides insights into people's beliefs, attitudes, values and behavior (Sommer, 1991). For this research, related questions were grouped together within the questionnaire. This seemed logical as it enabled easier variable connection for data analysis and was simpler for participants as one question flowed to another (Foddy, 1993). For example, questions 1 - 3 are about the familiarity of participants with the space and questions 4 - 6 are about how participants react in it. Questions 7-9 concern the future recommendations of local users, suggesting ways to increase interaction and physical activity in the space. The questionnaires were distributed to a total number of 50 people living around the space, selected during throughout the day to widen the sample to different types of users. Fig. 7 illustrates some of the results of selected questions answered by users living around the space from questions 1 and 2.



Q. 1 How familiar are you with the space?



Q. 2 How many times have you been to the space during the last year?



Q. 2 What kind of activities do you do in your leisure time?

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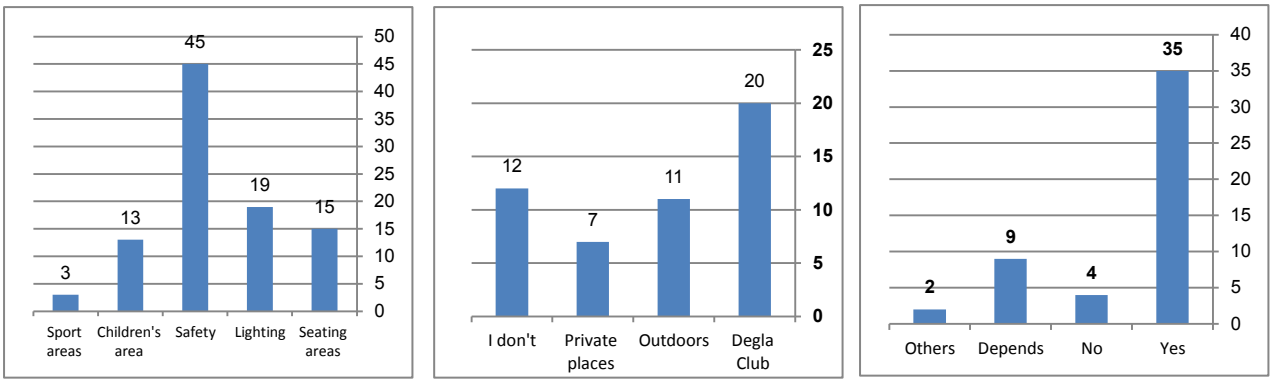

Q. 4 What could make you visit the space more often?

Q. 5 Where do you practice any kind of sport or physical activity?

Q. 6 Will the space be an alternative for your physical activity after it is redesigned to cope with your needs?

Fig. 7. Questionnaire Answers – Part 1,2 (The Researcher)

By analyzing the questionnaire results for the local residents living around the space, it can be noted:

- The major reason for not using the space is safety, although the majority of the selected sample regularly plays sports in other places.
- Most of participants indicated that they liked to engage in active recreation in their leisure time (30 users).
- The landscape was also an important element for encouraging passive activities in the park. 18 participants enjoy relaxing and reading in their leisure time.
- Maintenance of the space is another decisive factor that emerged from the analysis. Participants often cited lack of the maintenance as a reason that they do not like the space. Participants cited the poor condition of the greenery and trees as factors in their negative perceptions of the space.

With regard to the third section of the questionnaire, the participants' recommendation can be summarized as shown in Table 1.

Table 1. Questionnaire Answers – Part 3 (The Researcher)

Question	Participant Answers
What type of passive or leisure activity do you suggest to be added to the space?	Shaded areas Seats to allow for social interaction for groups and individuals Small cafe to attract different age groups to use the space
What type of active activity do you suggest to be added to the space?	Football playground Walking track Children's play area Mobile space for adult outdoor physical activity
General recommendations	Redesign the planting elements to increase the space exposure and avoid cutting it into isolated scattered parts, as exists now. Fig. 8a Improve the lighting to the safety factor for the space users. Redesign the pedestrian paths around the space to stop them being used for car parking. Fig. 8b

b. Planting elements isolate the space from the surroundings

a. The surrounding path is used as a car parking area

Fig. 8. Participants' Recommendations Regarding Planting Elements and Car Parking (The Researcher)

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5.5 Proposed Development Form

Fig. 9 illustrates the proposed urban space land use, followed by urban development form in Fig. 10.

1 ***Space main entrance.***
2 ***Playground.***
3 ***Playground seating areas.***
4 ***Open food court.***
5 ***Bike and sports track 500m.***
6 ***Sport track 250m.***
7 ***Children's play area.***
8 ***Shaded areas for relaxation.***
9 ***Mobile space for physical activity.***

Fig. 9. Proposed Urban Space Land Use (The Researcher)

The layout of the urban structure should reflect some important criteria to encourage physical activity in the space, which are: • *Reflecting the surrounding land use.* • *Strengthening the existing visual image and exposure to attract users.* • *Creating visually distinct zones to offer opportunities for many types of physical activity.*	***The choice of landscape elements can add to the main goal if it includes:*** • *Creating mobile spaces for different kind of sports, along with permanent structures in other areas.* • *Avoiding high-surrounded planting to increase the space's continuity.* • *Including well distributed and seating areas to enhance different social activities.*	***Scale means the size of urban space buildings or structures to the surroundings and users as well. It must accomplish:*** • *Hierarchy of using heights in urban space, with the minimum alongside the space's edges.* • *Using stairs and ramps to move in the space and to connect space areas with different heights and topography.*
Layout: Urban Structure	**Landscape**	**Scale: Height**
Massing is the combination of buildings or landscape elements in the same space, it should achieve: • *To achieve three-dimensional expression of the amount of development in the space, either in structures or greenery.* • *Reflecting the dynamic urban space skyline using different forms of masses.*	***Appearance detailing include style of lighting elements, landmarks:*** • *Details must be enhanced by reflecting local arts and crafts traditions.* • *Well-distributed lighting elements in the space means more safety and a clean image, and welcoming urban space.* • *Signs and landmarks to show the effect of physical activity on public health.*	***The richness of an urban space lies in its use of materials which contribute to the attractiveness of its appearance and the character of an area:*** • *The texture of used materials should suit the local weather, to increase the usability of the space at all times of the day.* • *Color patterns in the space must be unique, especially in children's areas to encourage maximum interaction.*
Scale: Massing	**Appearance: Details**	**Appearance: Materials**

Fig. 10. Proposed Urban Development Form (The Researcher)

6 CONCLUSION

The main conclusions derived from the research can be summarized as:

- It is very important to understand human behavior together with the social aspects of the local community in an urban space to create a design that increases residents physical activity.
- There is no perfect solution for the space: the goal is simply to create many opportunities by means of landscape features that allow residents to perform different types of physical activity.
- Further studies must be undertaken for different age groups and their required physical activity, such as (children – adults – the elderly). Because of research limitations, the selected sample were selected at

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random to achieve a general view of the problem.

- The proposed development in the paper is an initial attempt to cover different aspects of space design and explore how they could relate to the level of people's physical activity. The issue needs deeper analysis and application in different locations, considering varieties in social lifestyles as well as different types of spaces, such as hospitals and recreational centers etc.

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