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The Role of Healing Gardens in The Landscape Sustainability For Public Gardens

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Abstract

There were emergences trends towards achieving sustainability in landscape. But the study of the role of healing gardens in the landscape sustainability for the public gardens had not been studied previously in recent literatures. The research hypothesis is that healing gardens have a role in the landscape sustainability for public gardens. The research depends on a descriptive analytical study for public garden samples, which applied the design principles and elements of healing gardens (accessibility, Sense of control, Flexibility, etc). These gardens also relied in their designs on the basic principles of sustainability. The results showed that healing gardens effectively contribute achieving landscape sustainability for public garden through the use of natural materials, the cultivation of local plants, consistent with the local climate, and enhancing social interaction and sensory interaction with the landscape.

Keywords: Healing gardens, Sustainability, Landscape.

1. Introduction

There were an emergent trends for achieving sustainability in the twentieth century, in its various aspects appeared in the public life of societies Among these trends is achieving the sustainability of the natural landscape, as it represents an essential aspect of human communication with nature. Contact with nature had a positive impact on the health and well-being of human over time and in various civilizations, as it was believed that direct contact with nature positively affects the psychological or physical disorder of the humans [1]. Therefore, healing gardens are considered one of the functional necessities, according to modern medical theories, wherever they are found, these gardens play an important and effective healing role for all their users [2]. However, technological development has led to a move away from nature, and designers had focused on functional environments, and modern technological medical devices and various medicines had dominated healing methods instead of paying attention to other healing elements such as gardens[3]. The healing gardens were limited for hospitals to serve sick people and their visitors, or other health facilities only, it expanded to other users to benefit from it, without restrictions for the purpose of restoring their psychological balance and not feeling stress, anxiety and other pressures[4]. The research provides a definition of healing gardens and their design principles by introducing the basic concepts and their role in achieving the sustainability of the landscape of public gardens.

2. Healing and the Healing Environment

Healing is when the person is in a good health condition, free from anxiety and tension, and a cure for diseases, which is deeper than treatment and always comes from within us, and healing is not treatment, as a person does not have to be sick in order to practice healing. One of the common positive effects that healing causes is a reduction in Anxiety and stress, which in turn positively affect our bodies in many ways[2].The positive effects of the healing environment are known since ancient times, which can be called alternative medicine [5]. The healing environment can be defined as the environment that provides a kind of serenity and psychological comfort for all its occupants, and it depends on the possibility of stimulating which what known as self-healing resulting from reducing stress and psychological pressure on the person [6].



3. Healing Gardens

They are Gardens that are able to restore the psychological balance of humans so that they help them not to feel anxiety, stress and other pressures, and their presence is not limited to hospitals and health facilities only, but can be designed in various places such as residential areas, private homes, business centers and other places of gathering of the population, so that it can Any user can go to it and benefit from its features without restrictions because it has been designed in a way that makes it able to serve healthy and sick people at the same time [2].The following are the most important benefits of healing gardens:

3.1 Physical benefits

- Promote physical health
- Improving the immune response[7].
- Reducing the heart rate[8].
- Reduce stress and tension
- Improving fine and physical movement skills between hand and eye[9].

3.2 Psychological benefits

- Reducing stress
- Improving mood[10].
- Improving the quality of life[11].
- Increased self-confidence
- Improved sense of well-being
- Increasing the sense of calm and relaxation [12].
- ncreased sense of stability
- Increased self-esteem
- Improving personal satisfaction[13].
- Increased sense of pride and achievement
- Increased sense of ownership
- reduce anxiety
- Improved sense of self
- Alleviating depression[3].

3.3 Social benefits

- Improving social integration [14].
- Increased social interaction.
- Providing a healthy environment for teamwork[15].
- Improving group cohesion[16].

3.4 Cognitive benefits

- Enhancement of cognitive performance [17].
- Improve focus
- Improving the ability to pay attention[18].
- Achieving goals.
- Activating the memory[16].

3.5 Economic benefits

- Reducing recovery time.
- Reducing the quantities of medicines needed to treat patients[9].
- Minimizing healthcare costs.
- Improving job satisfaction, and general health, and reduces the stress of the workforce.
- Interaction with nature encourages a holistic/environmental approach to health[19].

3.6 Environmental benefits

- Increasing the preservation of green spaces.
- Improving the natural values inside the gardens [20].

3.7 Spiritual benefits

- Feeling of freedom and stimulating a sense of humility.
- Motivation to have different points of view.
- Connecting with nature can inspire feelings of peace, unity, connectedness and strength.
- provide spiritual inspiration.
- Contact with nature can reduce hallucinations and drug abuse[19].

4. The basic design principles of healing gardens

4.1 Accessibility

Accessibility to the garden is an important and basic requirement, even if the gardens are attractively designed, as users need to feel that they can easily reach through the entrances and corridors, as well as they can deduce the way and wander from one place to another. The garden must be visibly in terms of its location in relation to its surroundings, as the visibility of entry and exit to the gardens plays a major role in the effectiveness of its function, and this in turn relieves tension and pressure, increases patient satisfaction, provides comfort, and reduces the time required for treatment [21].

4.2 Sense of control

healing gardens should enhance the sense of control among users through freedom of movement in it, and this is achieved by providing diverse movement corridors or diversity in the organization of seating (individual or collective) and (fixed or moving) in (shade or in the sun) As well as by involving users in the design process of the gardens or choosing the types of events or types of plants in the gardens, and this enables them to make their own choices, which increases their self-confidence and thus reduces stress[22].

4.3 Quiet

Users of healing gardens need to feel quiet and be able to hear the sounds of birds, the sounds of the wind, or the sounds emanating from water sources, and they do not want to hear inappropriate mechanical sounds such as those emitted by air conditioners or traffic in the streets, and therefore it is necessary at the planning stage to choose places for the healing gardens is far from traffic, parking lots, airstrips and other sources of noise[23]. As well as planting trees whose leaves move easily and make sounds even in light winds to create patterns of color, shade, light and movement, providing a relaxing and meditative experience as well as masking some urban noise[24].

4.4 Flexibility

Healing Gardens should be designed based on when (i.e. what time and in what weather conditions) by whom (which groups) and how they are currently used (eg for a lunch break, exercise or social communication) and also on how their future use will be shaped To maintain interest and interaction throughout the year, for example, it must be studied to see how it is used in different seasons, and then designed by using different seasonal flowers, colors, and weather[25]. Accordingly, the garden must include elements that can be changed, moved, removed or added while ensuring that the garden remains flexible for more than one activity[26].

4.5 Privacy

Privacy can be achieved for users of healing gardens by providing open and closed places to stop and meditate and awaken all the senses to stimulate their sensory perception and places for solitary occupation by providing barriers or walking in the sand while providing rocks and taking into account the different desires and needs of users taking into account the human scale and enriching the spaces with sculptures and Organizing furniture or providing walls for painting and introducing sound effects into the environment with an abundance of aesthetic scenes, paying attention to colors and lighting, providing water bodies and shaded seats to create a calm and comfortable atmosphere [21].

4.6 Social interaction

Numerous research has shown that people who receive high levels of social support are usually less stressed and healthier than those who are in isolation and that social support improves recovery rates[27]. In order for the park to enhance opportunities for social support it needs to provide subspaces and seating areas that allow groups of two or more people to sit and talk in relative privacy[28].

4.7 Encourage physical movement and exercise

The possibility of movement and exercise carries physical and psychological benefits that increase the chances of recovery faster, and these exercises are of a moderate type and not of the exhausting types [6].

4.8 Provides art without ambiguity and complexity

An abstract art that is considered interesting or challenging by a person who is unstressed may be seen as intimidating or threatening by a person in a state of anxiety[27]. Hence, in a place like a hospital, which is known for its ability to lift symptoms of stress, it is necessary that art, sculpture, and other man-made elements of design be unequivocally positive in their message. Intricate abstract art that may be appropriately challenging in a museum or company hall is not appropriate in a hospital. Research indicates that patients prefer familiar, nature or landscape subjects and that patients recovering from heart surgery exposed to pictures of landscapes of water and trees experience less anxiety and require lower doses of strong pain relievers compared to those in groups without pictures[23].

4.9 Providing green spaces

An essential component of positive healing and a healing environment is the presence of green spaces. In general, exposure to nature can have a hugely beneficial effect on people's emotional state." The more a place evokes an image of a rich green garden, the more it will be used and appreciated as a healing place exponentially[29]. Therefore green materials should dominate garden design, This reduces artificial components to a minimum so that trees, shrubs and flowers make up about 70% of the garden and 30% for driveways and squares [30]. At the same time, green surface have an important role in the recovery process, as they reduce pollution and reduce noise, as they have the ability to absorb sound waves as well as absorb toxic emissions, encourage sports and improve the quality of life[31]

4.10 Feeling comfortable

Spatial comfort can be achieved by adopting the human scale and the correct proportions in the design of outdoor spaces in terms of the sizes of artificial components when they are available in sufficient number and the correct proportions such as umbrellas, seats, lighting, etc Or the natural ingredients in terms of density, distribution, final formation and colors, where warm colors such as red and its derivatives are used as a dominant element that generates a feeling of strength and activity for users in addition to providing water to break the deadlock and revive the coordination adopted as a prominent central fountain to act as a dominant element over the rest of the elements to show the aesthetic of the place starting from a central point as entertainment for users[32]. As for the green color it has an important role in the healing process, as it strengthens the heart muscle, regulates the movement of the diaphragm, increases the life of tissues, and is the most influential color on the nervous system. It is useful in treating high blood pressure, nervous tension and pain relief. It also helps in preventing influenza, malaria, and stomach ulcers, as well as in Treating heart diseases because it provides a sense of calm and balance and is also useful in relieving pain in case of cancer[33]. Finally, it should be noted the necessity of planting large umbrella trees to provide shade in the summer and comfort in the winter and to help in modifying the local climate and reducing the air temperature[34].

5. Sustainability of the landscape

The need to achieve sustainability in the landscape has emerged to ensure the provision of natural, economic and social resources, and to allocate sustainability resources intelligently when designing outdoor spaces. The sustainable landscape was defined as a response to reduce the negative effects of the landscape on the natural environment. The sustainable landscape should pay attention to providing natural resources for the future landscape as well as the past and present [35]. In addition, achieving sustainability requires the provision of all conditions related to the environmental, economic and social aspects. At the level of the environment, it is necessary to deal with natural and industrial materials together. Manufactured materials such as concrete may contribute to preventing rainwater run-off. Or create a land cover of wild and succulent weeds that

reduce local weeds, and maintain lawns. (Design with low water consumption plants) along with native plants helps reduce water use and conservation. Encouraging the social and economic aspects also includes nature trails allowing users to exercise, education and natural aesthetics at the lowest possible cost while relying on solar-powered lights and water features that recycle rainwater can be cost-effective and sustainable[25]. The following are the main determinants of a sustainable landscape :

- Choosing an effective design idea in a way that is consistent with the local climate and environment, provided that it is visually pleasing, inexpensive and with few resources.
- Choosing environmentally friendly flooring materials with high water permeability, such as sand or lawns, to benefit from rainwater as groundwater.
- Choosing materials for shade roofs and seating benches from materials compatible with the climate and the environment, such as wood, for example.
- Cultivation of local plants as they tolerate the environmental conditions of the country and are less susceptible to diseases and pests and do not require much care Such as eucalyptus, albizia and ficus..
- Afforestation of the outer wall with evergreen trees to protect against different types of pollution with the cultivation of climbers on the walls of the outer spaces to improve the local climate and enhance air quality.
- Avoid using pesticides and chemical fertilizers.
- The use of sawdust to reduce water loss by evaporation and to serve as a nutrient for the soil when it decomposes.
- Increasing open green spaces to rely on natural sources of lighting.
- Using modern irrigation techniques to irrigate plants in order to reduce water wastage.
- Saving rainwater for later use in watering plants.
- Preserve the natural sound pattern and reduce noise
- Enhance the aesthetic aspects of the landscape
- Enhancing human seating and gathering places within the landscape [21].

Among these determinants and others that may be commensurate with sustainability in the landscape, we can note the congruence of the determinants with the design principles of healing gardens and their desired benefits, which reinforces the main research hypothesis that healing gardens have a essential role in achieving sustainability for the landscape.

6. Research Methodology

The research methodology relied on the study and analysis of selected healing gardens samples, to show the design principles that were relied on, and the extent to which the characteristics of sustainability were achieved in the landscapes of these samples, through an analysis form which include principles and design elements for healing gardens, and the sustainability applications according to what was proposed in the framework. Then comparisons were made to show the garden sample that achieved the highest requirements of the healing gardens and sustainability landscape.

6.1 The Comfort Garden, San Francisco General Hospital, San Francisco, California

The first buildings to be identified as San Francisco General Hospital were erected in 1872. Constructed from 1915 to 1920, most of the current buildings were designed by city architect Newton Tharp in an Italianate style, and designed with glossy flowering plants to give the buildings added appeal. A comfort garden (Figure 1) is a small outdoor space (about 100 by 160 feet). Established in June 1990 The garden is located next to Buildings 80 and 90 adjacent to the six-storey brick buildings with rows of side windows overlooking the outdoor space. These buildings border the garden on two sides, and on the other two sides are fences separating it from 22nd Street and a parking lot. The garden includes five grassy areas surrounded by concrete paths and flowerbeds. Most of the walkways are designed to ensure easy direct pedestrian movement, One of them is constructed from decomposed granite and the other is made of blocks cut from redwood in bark mulch and is clearly designed for more natural walks. The tree trunks are arranged in flower beds, and the rocks are placed among the annual flowers planted in colorful displays. There is no weeds and no litter. However, the garden has a natural look and is not manicured and has the image of a 'country cottage garden', part of which was altered in 1994 to add a more formal sculptural element. It consists of curved, staggered paths bordered by granite parapets and five Large granite blocks that double as sculptures and nature benches, three ring-shaped flowerbeds planted with herbs Inside and alongside the natural permanent border that runs the length of the garden, there are a variety of places to sit. About 85 percent of the garden is exposed to the sun, and both garden benches and all granite blocks sit in the sun almost all day. After the analytical study, based on the theoretical aspect, the research found that is shown in Table (1).

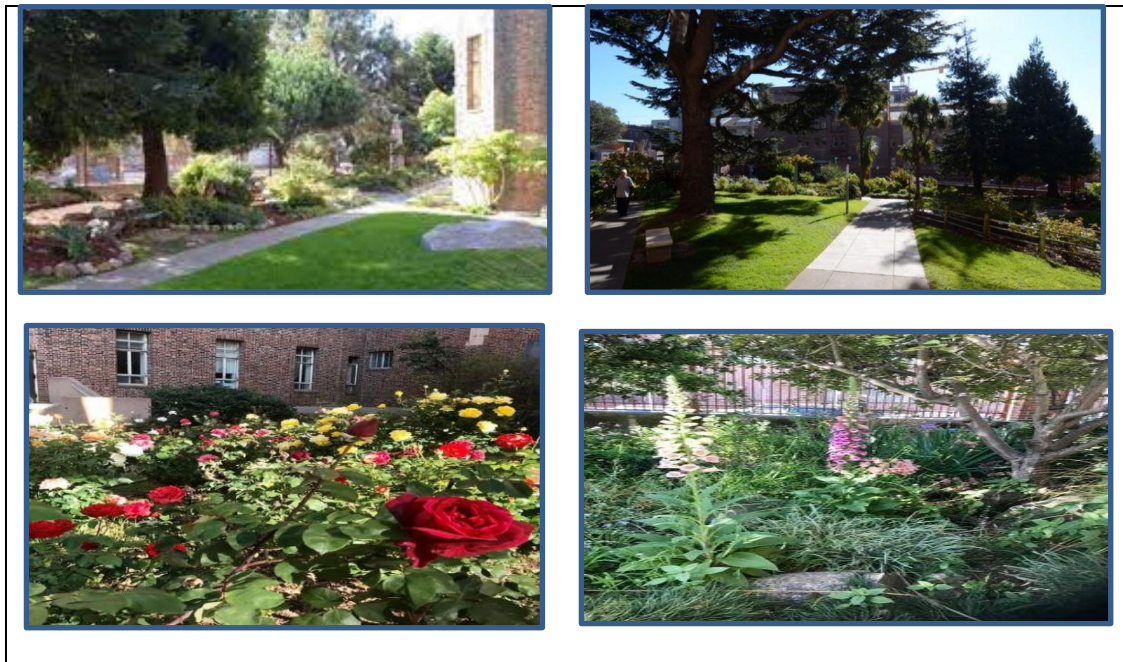


Figure 1. Rest Garden.

Table 1. Study and analysis of Comfort Garden in San Francisco Hospital.

No	Principles and Determinants	Available	Not Available
1	accessibility		
2	Sense of control		
3	Flexibility		
4	Provides art without ambiguity and complexity		
5	Quiet		
6	Feeling comfortable		
7	Providing green spaces		
8	Privacy		
9	Social interaction		
10	Encourage physical movement and exercise		
11	Use of local plants		
12	Use of modern irrigation techniques		
13	Save rain water		
14	Use of local natural material		
15	Provide shaded seating		
16	Acoustic environment design and noise reduction		

6.2 Rosecrance healing garden

Rosecrance healing garden (Figure 2) is located in the city of Rockford, belonging to the US state of Illinois. It was established on an area of approximately 6 acres and was opened in two phases, the first phase was completed in the fall of 2004, and the second phase was completed in the spring of 2006. This garden was designed with the aim of achieving balance between hearts and minds by providing exceptional spaces different from the external urban environment interacting with Nature in a positive way, while designing the Rosecrance Healing Garden, harmony between the Japanese garden and contemporary designs was taken into account. The garden was designed without any straight lines, as it used curved paths to encourage visitors to explore and provide the element of surprise with the addition of wonderful groups of rocks and stones, which is considered the balance of movement Vertical and horizontal, in addition to plant groups of attractive colors and of different textures. It should be noted that the garden is open to all ages and all social groups alike. The landscape and the natural and artificial components of the garden can be described according to the following:

- Courtyard and serenity circle: they include a group of large stones used as benches to sit on. They are located near the waterfall and are used as a place for community activities and gatherings.
- Path walks: There are a number of winding Path walks within the garden with a length of 1.5 miles. The main Path walks is paved and encircles the water pool. There are also secondary sandy Path walks next to the waterfall, as well as a few stone Path walks that connect the parts of the garden with each other.
- Bridges: The garden contains different types of bridges, some of them are wooden, some are stone, and some are in the form of a rocky walkway, all of which work to excite the senses of users.
- The towers: designed in the style of the towers of ancient cities containing bells.
- The Pond: It is a 13-foot deep pond that provides an opportunity for meditation, leadership and control.
- Cascading Waterfalls: Provides a set of audio stimuli that strike the senses of users.
- The peninsula: where the water meets the land without clear boundaries, and provides isolation.
- Grate full outlook: the highest point in the garden is the best point that has been designed and achieves a very high view as if it were the top of a mountain, but on the scale of the garden, and with the sounds of muffled waterfalls, semi-natural forests and evergreen trees, a very strong scene is available for users and a great healing opportunity. After the analytical study, depending on the theoretical side, it was found for the research shown in Table (2).

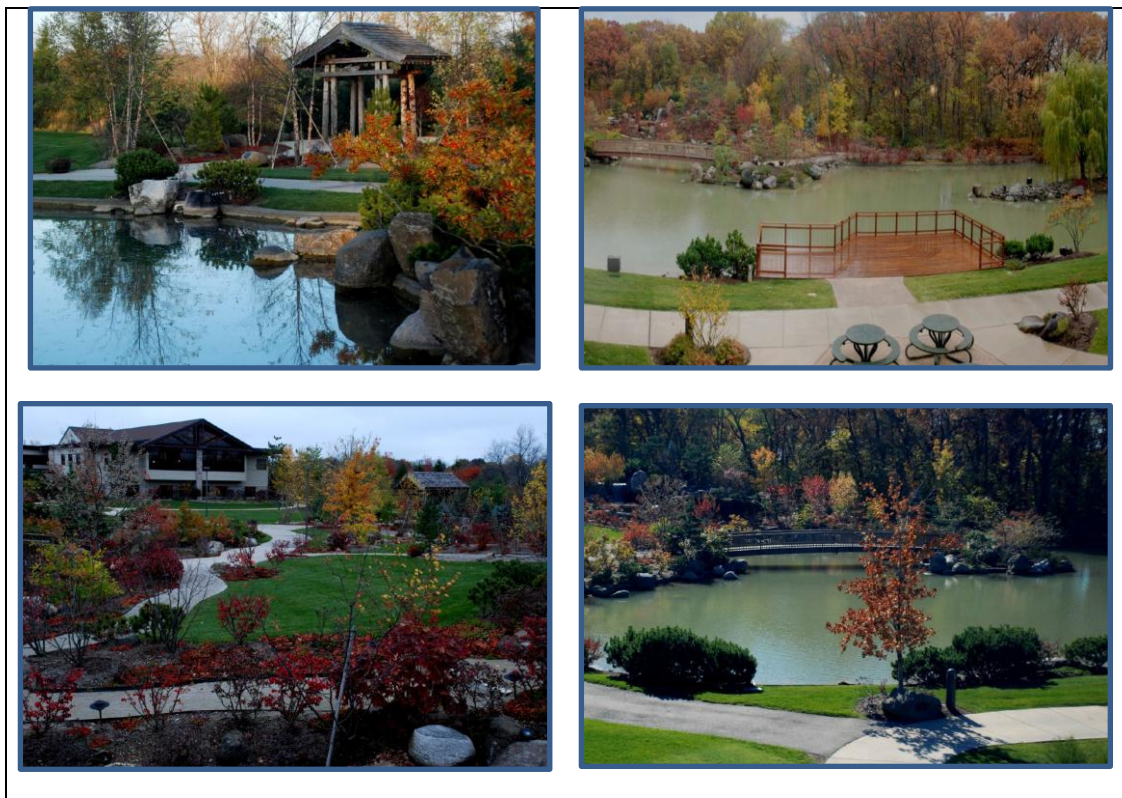


Figure 2. Rosecrans Garden.

6.3 Leichtag Family Healing Garden, Children's Hospital and Health Center, San Diego, California

It is the primary hub for children's health care in the San Diego. It accommodates more than 200,000 inpatient and outpatient visits annually. Opened in 1997 The garden (Figure 3) is located behind the hospital, on its northwest side. There are garden signs (in English and Spanish) beside the lifts off the main lobby. can be seen the garden from the nearby lobbies and staircases on several floors of the hospital. The garden is entirely enclosed in brightly painted curvilinear walls 4 to 7 feet high and inserted under a large tubular steel structure. Bougainvillea is planted at the base of this frame and covers at the end which is meant to be a huge vine-covered dinosaur; Colored surfaces (orange, dark blue, purple, green, yellow) provide a vibrant backdrop for the ceramic animals, fish and insects with which they are decorated and for the perennials planted around the garden border against the walls.. The wall you first see upon entering is a deep blue and has stained glass installed in the patterns of the constellations, which glow when the afternoon and evening sun shines through. The other walls are decorated with ceramic figures or have steel plates with slots in the shape of animals. In the center of the garden is a ceramic basin of sea horses, in which two tall nozzles spew water into two high ceramic pools. The sound of water could be heard all

over the place.. There is plenty of space to sit, varying by location, material, width, and feeling of containment). After the analytical study of the study case, depending on the theoretical side, it was found for the research shown in Table (3).

Table 2. Study and analysis of Rosecrans Garden.

No	Principles and Determinants	Available	Not Available
1	Accessibility		
2	Sense of control		
3	Flexibility		
4	Provides art without ambiguity and complexity		
5	Quiet		
6	Feeling comfortable		
7	Providing green spaces		
8	Privacy		
9	Social interaction		
10	Encourage physical movement and exercise		
11	Use of local plants		
12	Use of modern irrigation techniques		
13	Save rain water		
14	Use of local natural material		
15	Provide shaded seating		
16	Acoustic environment design and noise reduction		



Figure 3. Lighttag Garden.

Table 3. Study and analysis of the Lighttag Garden in San Diego Children's Hospital.

No	Principles and Determinants	Available	Not Available
1	accessibility		
2	Sense of control		
3	Flexibility		
4	Provides art without ambiguity and complexity		
5	Quiet		
6	Feeling comfortable		
7	Providing green spaces		
8	Privacy		
9	Social interaction		
10	Encourage physical movement and exercise		
11	Use of local plants		
12	Use of modern irrigation techniques		
13	Save rain water		
14	Use of local natural material		
15	Provide shaded seating		
16	Acoustic environment design and noise reduction		

Table 4. A comparative analysis between the three study cases.

No	Principles and Determinants	Comfort	Rosecrance	Leichtag
1	accessibility			
2	Sense of control			
3	Flexibility			
4	Provides art without ambiguity and complexity			
5	Quiet			
6	Feeling comfortable			
7	Providing green spaces			
8	Privacy			
9	Social interaction			
10	Encourage physical movement and exercise			
11	Use of local plants			
12	Use of modern irrigation techniques			
13	Save rain water			
14	Use of local natural material			
15	Provide shaded seating			
16	Acoustic environment design and noise reduction			

Conclusions

- All study cases were characterized by accessibility, a sense of control, privacy, social interaction and all the basic determinants used to obtain a sustainable landscape.
- Ease of access is achieved through visibility, simplicity, and distinctiveness of entrances, exits and movement paths, and the availability of signs with easy visibility.
- The feeling of control is achieved through the availability and diversity of walkways and the diversity in the organization of seating areas, as well as the involvement of the users themselves in the design process.
- The principle of providing calm is achieved by keeping car parks and airstrips away from parks and increasing the density of vegetation to block noise and reduce the sources of sounds emitted by air conditioners, generators and traffic. It is also important to provide sources of white noises to overwhelm the noise.
- The principle of a sense of spatial comfort is achieved through the adoption of the human scale in the design and the availability of natural and artificial components and their appropriate distribution.
- Flexibility is achieved through the use of portable and lightweight seating, providing sunny and shaded places, planting different seasonal plants, diversifying the use of colors, and making paths of changeable natural materials.
- The principle of providing art free from ambiguity and complexity is achieved through the use of art, sculpture and positive design elements and a move away from complex abstract art.

- Privacy is achieved through the availability of gates, fences, and closed spaces for solitary occupancy, as well as reducing intrusion or penetration.
- The principle of providing green spaces is achieved by providing the plant element in all its forms at a rate of 70%, and the optimum use of the spaces to ensure the dominance of the green color in them.
- Social interaction is achieved through the availability and diversity of spaces, with the provision of sub-spaces and collective seating areas.
- The principle of encouraging physical movement and exercise is achieved by providing multiple paths that allow exercise, as well as providing a variety of spaces.
- Sustainability is achieved through the use of natural walkways, benches and wooden sheds, the use of a design that is consistent with the local climate and environment, the cultivation of local plants, the use of solar-powered lighting elements, and the increase of open green spaces to rely on natural sources of lighting.
- Two of the case studies (Comfort Garden and Rosecrance Garden) were characterized by flexibility, art free from ambiguity, complexity, comfort, availability of materials and green spaces, and Encourage physical movement and exercise while the third case did not confirm its design on these principles.
- One of the study cases (Comfort Garden) was affected by noise, while the rest were quiet.

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