

O 29. SENSORY GARDENS: DESIGN CRITERIA AND CASE STUDIES

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ABSTRACT: In urban life, humans' longing for nature increases persistently. Sound, visualizations, smell are perceived as a whole. Plants have an important role in nature. Plants' colors, textures, smell can be both stimulating and relaxing. Nowadays, to strengthen the bond between humans and nature, designers integrate green into their projects because nature's positive impact on humans is a well-known fact. In this study examined the sensory gardens as a way of natural therapy, the historical process, design criteria and the example of some studies.

Keywords: *Garden therapy, Landscape, Sustainability environmental*

1. INTRODUCTION

Gardens are unique forms of connection between humans and nature. Many cultures' perspective on gardens is that they are "the reflection of heaven on earth". Gardens or yards are considered to be small-scaled landscape projects. Nature's positive impact on humans is a well-known fact, therefore gardens themselves can be linked to human behaviour. Besides the psychological impacts the gardens have, some are customized to serve specific purposes as they address directly humans' senses and aim to enrich the users' experiences. These gardens are known as "Sensory Gardens". Worden and Moore (2004) stated that sensory gardens aimed to enhance the user's experience of seeing, smelling, hearing, touching and tasting. Shoemaker (as cited in Access by Design,) asserted that "Sensory gardens could not be designed without considering the human element. Unlike traditional display gardens that were meant to be observed from a distance, sensory gardens draw the visitor in to touch, smell and actively experience the garden with all senses." If these gardens are designed and maintained well, they provide educational and recreational services; the key factors are hardscape elements, colors and textures (Hussein et al., 2013). According to Hussein (2012), sensory gardens were derived from gardens for blind people. The idea behind the sensory garden design was that the gardens should aim to stimulate users' senses and improve their physical abilities (Hussein, 2009). Integrating green into design contributes to users' health improvements (Vries as cited in Hussein et al., 2013), environmental education (Hussein et al., 2013), mental and emotional development (Maller and Townsend as cited in Hussein et al., 2013). Stoneham (Hussein, 2010) states that sensory gardens were originated from the 1970s gardens for blind people. These gardens used to be in parks where heavy-scented plants, raised planters and Braille signs. In the 1980s, the idea of being only for the blind started to change due to the fact that blind people did not want to be in segregating facilities. Sensory Trust is an organization that makes outdoor facilities accessible for everyone and aims to create a connection between people and nature. The organization helps improve the health of people with disabilities, their families and their careers (Sensory Trust, 2020).

Jane Stoneham, the director of Sensory Trust, (as cited in Access by Design, 2020) points out that the design guides for sensory gardens are still unclear and the projects rely on the designer's approach and experience. Today, sensory gardens provide for visually impaired users, people with autism spectrum, and elderly with Alzheimer's. Also, in public spaces, sensory gardens are used for the enrichment of people's sensory experience and children's education.



Figure 1. Activities with people with autism (Yuruk as cited in Sensoy, 2017, p. 121)



Figure 2. Forest school for children with special needs in Duzce - Turkey (URL-1)

2. SENSORY GARDEN DESIGN

If designed and maintained well, a sensory garden can serve many purposes. Different purposes bring a broad spectrum of users. Therefore, sensory gardens must have unique characteristics to them. Worden and Moore (2004) stated that “When wheelchair users or children, were the impetus for creating a sensory garden, they should be consulted or input to ensure that their specific needs were met. The ill or weakened can be enlivened and renewed physically, mentally, or spiritually by sensory gardens. Individuals with impairment of one or more of their five senses may find special enjoyment because they may have enhanced perception in their other senses.” Design criteria for sensory gardens were listed as (Worden and Moore, 2004): Plant selection, sight, sound, smell, touch, taste.

Plant Selection

The selection of plants was a crucial step in landscape design. (Yildirim Birisci et al., 2012,) listed the use of plants:

- Structural material: Blocking the unwanted view, creating a space, forming a sense of direction
- Environmental element: Erosion management, climate control, reduction of air pollution
- Visual element: Creating focal points, connecting the design elements, ensuring transition, incorporation of color

Nontoxic, sustainable and easy-care plants with proper features of color-texture-smell should be used in sensory gardens. The selection of plants for sensory gardens require extreme precision and attention because these gardens aim to address users' senses. Breaking off leaves, flowers or stems, plants' fluids and aromas can propagate easily. Thus, the selection of nontoxic plants was an essential step. Worden and Moore (2004) stated that if maintenance of a plant requires pesticide applications, they should not be used in sensory garden projects. In order to stimulate users' senses, the plants with characteristic features should be selected regarding their appearance, scent, taste and texture. To give an example, mint could stimulate two senses: both smell and taste (Worden and Moore, 2004). This study provided further information about the selection of plants under the subjects as sight, sound, smell, touch and taste (Table 1).

Sight

Akpinar and Ersozlu (2008) mentioned that in the cognitive learning process, the visual sense was effective in understanding the universe as it provided data for human perception to form. To create visual impact, a designer used every aspect of color. Various psychological impacts of every color, the change of hue in shade and light, the reflection of color and light contribute to the stimulation of senses. Wavelengths reflected back from objects, this way humans could see colors. Perception of colors relies on the light source and environmental factors. In the cool temperate climates, pale colors can be fully appreciated but vibrant ones cannot. On the contrary; in hot temperate climates, vibrant and warm colors can be seen properly, but the pales ones cannot. Therefore, the color of flowers were perceived best at noon (Hannebaum as cited in Birisci et al., 2012). In sensory gardens warm colors such as red, orange and yellow stimulate the senses (Figure 3); cool colors such as blue, purple, white have calming and soothing effect. Flowers are a conventional way of integrating color into the design. Colorful fruit trees, plants and tree trunks enhance the visual quality of space (Worden and Moore, 2004). Partially sided users could see colors in big blocks, thus the placement of plants and hardscape elements need to be done carefully. Furthermore, the use of light can enrich the user experience in sensory gardens. Lighting fixtures, torches and chrome gazing balls contribute to the design (Worden and Moore, 2004) (Figure 4).



Figure 3. *Ilex verticillata*, is a shrub with an eye-catching color



Figure 4. Chrome gazing balls (URL-2)

Size and Shape: Size and shape of the design elements build a variety of perceptions. As in architectural design, in landscape architecture projects; if there is no gradual transition in size, humans are likely to feel misplaced and unsafe. Therefore, the human-scale should always be considered. A gradual change in the size of every design element should be an essential point in projects. Booth (Birisci et al., 2012) asserted that tall trees and shrubs make the eye look high up to the sky and distract from the horizontal elements. Small objects and roads with trees on both sides create focal points, densely planted trees define the space. Linear or curvilinear lines ensured by living fences also help users find their direction. Linear lines are thought to be more formal than curvilinear ones. Curvilinear lines and sloppy compositions are more natural and freeing. Pendulous trees have a calming and soothing effect (Birisci et al., 2012).

Signage and Labelling: Fundamentally sensory gardens require labelling components. Brochures and informative posters that introduce the plant within the area enhance user interaction. Color codes for different senses can be extremely useful. Visually impaired users' needs must be considered, therefore signboards with the Braille alphabet should be used as well as the informative audio system (Worden and Moore, 2004).

Sound

Hardscape and softscape elements are used for the stimulation of users' senses in sensory gardens. Nature always addresses humans' senses. Leaves blowing in the wind, branches swinging, dried leaves on the ground, animals and water enrich the human experience in a garden. Waterfalls, fountains, sprinklers, wind bells and other components contribute to the sense of hearing (Worden and Moore, 2004) (Figure 5).



Figure 5. Interactive music element and Deerscare (URL-3)

Smell







The sense of smell is mostly stimulated in every garden. Some plants have pleasant scents and some do not. The research shows that the sense of smell contributes to visual perception as it helps clarify what is seen. In fact, during memory encoding, the sense of smell is more effective than the sense of sight. Therefore, the two senses are not opponents in the cognitive learning process, they support each other (Akpınar ve Ersozlu, 2008). Thus, sensory garden design criteria are all linked to one another.

Touch

Every plant has a unique shape and texture (i.e. fruitful and fruitless; soft and firm; needle-leaved, fan-shaped, flaking barked; coniferous, seedy; evergreen, semi-evergreen ones). These varieties help contribute to the sense of touch in sensory gardens. In Turkey, grassed areas are very common also they can be very useful for sensory gardens due to the fact that people can sit, lay down which results in the stimulation of the sense of touch. Toxic plants and the ones which can physically hurt people should be avoided. Worden and Moore (2004) mentioned that during user interaction, plants can be harmed as well. Therefore, longlasting and durable plants should be selected. Especially children enjoy woolly

plants, moss, tree barks, plants' sticky substances, succulent leaves, vegetables such as beans, peas. Many plants have different textures. Roses (*Rosa sp.*), have elegant and soft petals as well as thorns. Buttonwood (*Conocar puserectus*), have soft, gray leaves and a firm bark. However, spiny plants such as agave and rose can be dangerous for visually impaired users. If these kinds of plants are used, they should be located out of reach (Worden and Moore, 2004).

Table 1. The examples of plant function for sensation







	
<p><i>Platycodon grandifloras:</i> Sound - "Inflated buds make a popping sound when squeezed." (Graper, 2019)</p>	<p><i>Baptisia australis:</i> Sound - "Seed pots create a rattling sound when shook." (Graper, 2019)</p>
	
<p><i>Agastache chefoeniculum:</i> Smell - "They have black licorice-like scent when leaves are rubbed between the fingers." (Graper, 2019)</p>	<p><i>Nepeta mussinii:</i> Smell - "They release a scent when leaves are rubbed between fingers." (Graper, 2019)</p>
	
<p><i>Stachys byzantine:</i> Touch - "The fuzzy, furry foliage and stems appeal to the sense of touch." (Graper, 2019)</p>	<p><i>Allium schoenoprasum:</i> Taste - "They are commonly used as an herb to provide a mild, onion-like flavor." (Graper, 2019)</p>




Taste

Fruits, vegetables, herbs, edible plants and flowers can be used in sensory gardens. Different parts of the tongue detect sweetness, bitterness, sourness, and savories. Many activities can be organized in order to enrich the sense of taste. Small-scaled agriculture training programs, cooking workshops, barbeque and picnic organizations can take part in sensory gardens' agenda (Worden and Moore, 2004).

3. SENSORY GARDENS: CASE STUDIES

Hussein et al. (2013)'s research about the two sensory gardens in the Royal School of Deaf and Communication Disorders and Lyndale School expressed the current use of sensory gardens.

Royal School of Deaf and Communication Disorders, Manchester, UK	
<p>RSDCDS's sensory garden has been designed by Sue Robinson and the garden is called Multi-Sensory Millenium Maze. The designer stated that the aim of the project was to offer various sensory experiences to the users (Hussein et al., 2013).</p>	
 <p>Pathways (Hussein et al., 2013)</p>	 <p>Water feature at the Water Central Area (Hussein et al., 2013)</p>
 <p>Exploraway (Hussein et al., 2013)</p>	 <p>Vaporized Trail (Hussein et al., 2013)</p>
 <p>Musical instruments in the Asteroid Arts Garden (Hussein et al., 2013)</p>	 <p>Raised planters at the Water Central Area (Hussein et al., 2013)</p>

Lyndale School, Liverpool, UK		
<p>The least used area is the pathway and slope. The path ends suddenly, therefore it is inefficient. Woodland garden is appreciated regarding its sound experience stimulating features, however it results in the lingering of people and crowd. Thus, circulation problems occur. Due to the slippery surface at the boardwalk of the water feature and inaccessible raised beds, the area has second-lowest number of users (Hussein et al., 2013).</p>		
 <p>Pathway network (Hussein et al., 2013)</p>	 <p>The path ends suddenly (Hussein et al., 2013)</p>	 <p>Water feature (Hussein et al., 2013)</p>
<p>Hussein et al. (2013)'s research states that:</p> <ul style="list-style-type: none"> ➤ An accessible and effective pathway network enhances the design quality of a sensory garden. ➤ Pathways are the most essential elements that invite the users to the sensory gardens. ➤ Areas that offer sensory experiences have a higher number of users than the ones with aesthetical design features in them. 		

4. CONCLUSION AND SUGGESTIONS

In recent years, most people started to become visitors to sensory gardens due to their health problems or desire to be in tune with nature. Considering the historical background of sensory gardens, design guidelines and criteria are yet to be defined. Therefore, every sensory garden's design process relies on the designer's approach and experiences. However, recent researches and observations show that the essential point of designing a sensory garden is to offer sensory experiences to the user. Accessibility and safety also are two principles that play a significant part in sensory garden design. Creating opportunities for sensory experience is more important than the design being an aesthetic entity.

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