EXPERIENCING AND ENGAGING ATTRIBUTES IN A SENSORY GARDEN AS PART OF A MULTI-SENSORY ENVIRONMENT

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This study looked at how children with special educational needs and their adult carers engage with attributes in a sensory garden during their literacy session. Walk-through interviews, personal observations and behavior mapping of on-site activities, which the author recorded as anecdotal evidence, were undertaken at the Royal School of Communication Disorders in Manchester, United Kingdom, to illustrate users' experience in a multi-sensory learning environment. This data gathering was conducted in May and July, for seven days each month. The data were recorded continuously from 9am to 3pm on weekdays during the school term. The main findings show that attributes in a sensory garden challenge students' perception and motivate them to practise their motor skills as well as enable them for way finding, the chance to encounter some familiar and unfamiliar attributes.

Keywords: Learning environment, literacy, multi-sensory, sensory garden

The term 'sensory garden' has been very much over-used in recent years but, in a therapeutic context, it usually refers to a small garden that has been specially designed to fulfil needs of people who want to be involved in active gardening and enjoy the passive pleasures of being outdoors amongst plants (Gaskell, 1994). Lambe (1995, p. 114) differentiated sensory gardens from any other garden as:

> 'The only difference in a sensory garden is that all attributes of hard landscaping, soft landscaping, colours, textures and wildlife must be carefully chosen and designed to appeal to the senses in such a way that they provide maximum sensory stimulation'.

Shoemaker (2002, p. 195) added, 'Unlike traditional display gardens that are meant to be observed from a distance, sensory gardens draw the visitor in to touch, smell and actively experience the garden with all senses'.

It is often assumed that sensory gardens are for people with immobility or other impairments, where these gardens are usually attached to a special school or home for the elderly (Lambe, 1995). This attitude was reflected in the early design and construction of sensory gardens which were focused on too few sensory experiences. In an interview that I conducted with Jane Stoneham in 2006, the director of the Sensory Trust (www.sensorytrust.org.uk) and the author of the book, *'Landscape Design for Elderly and Disabled People'*, Stoneham stated that the initial idea of sensory gardens was derived from the horticultural therapy movement which developed in the United Kingdom in the 1970s. Horticultural therapy was focused on special environments, i.e. hospitals and rehabilitation units and, as a result, was developed more rapidly than sensory gardens which used to be 'gardens for the blind'. One positive aspect of sensory gardens was the genuine response to meet the needs of visually-impaired people. Stoneham added, however, there was not really much thought given to the design of these gardens. The first sensory gardens were often located in public parks because the local authority would have decided that it was a way of showing that they were implementing inclusion strategies. However, the reality was that they were small areas, often signposted as 'Garden for the Blind', which consisted of a combination of scented plants, Braille labels and raised planters.

Over time, society's attitude to disability changed, as did the function and users of the sensory garden. Any design for disabled people should aim to help overcome the stigma that is attached to being labelled 'disabled'. Since the mid-1970s, a rapidly growing body of opinion has suggested that this can be achieved more easily by integrating, rather than segregating facilities. In 1978, the then United Kingdom Minister for the Disabled, Alfred Morris, said:

> 'The simplest way of causing a riot in any locality in Britain would be to clamp on the able-bodied the same restrictions that now apply to the disabled. They feel that their personal handicaps are bad enough without the gratuitous social handicap of being treated differently from everyone else' (quoted in Rowson, 1985, p. 21).

Stoneham (2006) added that in the 1980s, visually impaired people challenged the initial ideas about 'gardens for the blind' because the issue of being segregated from able–bodied people was itself beginning to be challenged. It is now widely understood that disabled people do not want to be segregated from able-bodied people in their enjoyment of green space. Thoday and Stoneham (1996, p. 20) support this idea, 'the *sensory landscapes* should be a way of introducing much greater interest and variety into green spaces for everyone to enjoy and should not result in *gardens for the blind*'. The basic idea is to integrate green spaces that will allow an enhanced sensory experience, which will make for a more sustainable and inclusive approach rather than making 'special' provision for the disabled (O'Connell & Spurgeon, 1996).

OBJECTIVES OF THE STUDY

In an interview that the researcher conducted with Kath Jefferies in 2007, who is a retired deputy head teacher of a special school in Liverpool, she mentioned that, "Every special school has slightly different needs. The sensory garden will reflect those needs so no sensory garden will be the same. They might have similar elements but there will always be an emphasis upon the needs of their individual children."

Following on from Jefferies's statement, the research objective is to observe and record how users respond to and engage with the attributes in a sensory garden. The research findings showed users respond in fundamentally different ways when they encounter familiar or unfamiliar attributes.

LITERATURE REVIEW

The evolution of the multi-sensory environments began in the 1970s (Hirstwood & Gray, 1995; Hogg et al., 2001). However, it was only in the late 1980s that they started to take account of visual and aural ambiences and to install equipment that could accommodate the needs especially of people with profound and multiple disabilities in special schools and nursing homes (Mount & Cavet, 1995). Hogg and Sebbas's (1986) and Longhorn's (1988) research examined the development of auditory, physical and visual disabilities in people with profound and multiple disabilities; and they developed respective multi-sensory curricula. Longhorn suggested, "without stimulation and an awakening of the senses, children with profound and multiple learning difficulties would find it almost impossible to make sense of their experiences and to begin to learn" (Mount & Cavet, 1995, p. 52).

As a result, a multi-sensory curriculum was integrated into the special needs educational system to accommodate the United Kingdom's national curriculum (Byers, 1998; Mount & Cavet, 1995). For the purpose of this research, "multi-sensory environment" will be used when describing this type of approach, to which students with special educational needs could be exposed, namely, to a stimulating environment that is designed to offer sensory stimulation using textures, colours, scents, sounds, and so forth.

According to Bell (1993):

> Each adult working with a child with multiple disabilities has an important role in ensuring that the child is able to make sense of the environment using appropriate information from a range of sensory channels. In attempting to provide the child with a balanced understanding of the environment, the adult will need to structure on appropriate learning environment which can be both reactivate to the child's actions and responsive to the child's needs' (quoted in McLinden, 1997, p. 321)

Nowadays, multi-sensory design in the context of a garden is becoming increasingly popular for educational purposes in special schools (*Building Bulletin 102*, 2008; Westley, 2003; Woolley, 2003; Frank, 1996; Stoneham, 1996; Titman, 1994), for rehabilitation purposes in hospitals (Cooper, Marcus, & Barnes, 1999; Tyson, 1998) and for health benefits in nursing homes (Stoneham, 1997; Stoneham & Thoday, 1994).

In a discussion the researcher had with Jane Stoneham in 2008, she strongly recommended visiting 'The Spiral Garden' at the Eden Project in Cornwall, which had been designed as a children's garden (see Images 1–3). The Spiral Garden is not designed as a sensory garden but it is rich in texture and offers different stimuli to engage children's senses. Most attributes in the garden have been made from natural and recycled materials, which add to the children's' creative, innovative and imaginative play.

Image 1: The Spiral Garden, showing the willow tunnel at the entrance, which gradually changes in height and space as you travel along it.

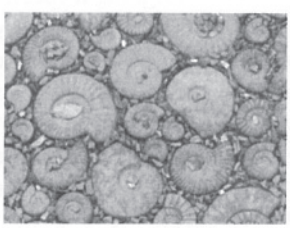


Image 2: One of the surface materials used near the willow tunnel.

Image 3: Coloured pathway with a variety of plants, leading to different pocket spaces.

Having a multi-sensory environment in special schools is beneficial for both teachers and pupils as it provides a two-way learning process. As outlined in the *Building Bulletin 77* (1992, p. 49),

> Outdoor spaces can provide opportunities for observation, investigation and problem-solving and form a flexible facility often more readily adaptable to change in user requirements than the building itself. They

can offer a stimulating environment suited to practical activities from which many pupils with special needs can benefit.

This idea matches beliefs that outdoor environmental learning can influence children's behavior in terms of reducing aggressive behaviour and assist in their development in terms of mental, health, emotional and social relationships as well as provide a stimulating sensory experience, especially when in contact with animals and plants (Long & Haigh, 1992; Maller & Townsends, 2005/2006; Malone & Tranter, 2003; Moore, 1999; Rohde & Kendles, 1994, Lucas 1996; Stoneham, 1997; Titman, 1994; Woolley, 2003). This notion has received further support from Barbara Dunne of the Royal School for the Deaf and Communication Disorders, Manchester: 'Pupils are most likely to succeed when they are involved in 'doing' activities rather than academic learning. Environmental education is an ideal activity learning medium' (Lucas, 1996, p. 26; Stoneham, 1996, p. 8). To conclude, multi-sensory environments are used by individuals with all kinds of disabilities in special schools where this offers them the opportunity to engage in self-stimulating activities while enhancing learning opportunities outdoors.

Attributes of Multi-sensory Experiences

Building Bulletin 102 (2008) outlined the requirements when designing a special school that provides an accessible outdoor space that emphasizes multi-sensory experiences for therapy, educational and recreational use. One of the ways in achieving a multi-sensory environment through the use of soft-landscaping is to have fast growing plants, shady plants and plants that are able to provide visual stimulation through the use of colors, texture and scents (Hussein, 2005). These plant qualities must be carefully considered so that they provide mystery, the ability to hide and to create space. Two examples of such special schools with this kind of environment are the Meldreth Manor School in Hertfordshire (Frank, 1996; Stoneham, 1996) and Hazelwood School in Glasgow (completed in 2007). Their sensory gardens were designed with a series of path network integrated and woven around the existing trees. While this preserves the trees, it offers a variety of sensory experiences.

Climatic factors such as temperature, wind and rain also contribute to the sensory experiences that can trigger senses of the users. These were recorded during the researcher's case study observation period. For example, walking under a row of shady trees on a sunny afternoon might be evaluated as a comfortable ambience. In contrast, a stormy day with heavy rainfall might be evaluated as an undesirable situation to be in the natural landscape. Cool temperatures in the morning and evening provide users with the chance to enjoy the weather in comfort, whereas high noon temperatures sometimes need to be avoided. Thus, allowing users the opportunity to engage with natural forces supports the link that has been established between personal experiences and

developing environmental cognition; an individual's learning process has to occur to let people understand the benefits or disadvantages of the natural attributes. An example of anecdote to illustrate the climatic factors is as follows:

> It was a misty morning. A young boy with his teacher was having a leisurely walk in the sensory garden. As they walked on the boardwalk underneath a shady canopy, the teacher jumped and grabbed a branch. The boy looked at her and wondered why she had done that. '*I have a surprise for you... are you ready?*' she asked. Both of his hands were holding the rope railing while jumping with excitement. The teacher had a good grip of the branch, ready to give him a big surprise. She shook it hard with both of her hands and down came drips of rainwater from the leaves. The boy was so surprised; he let go of his hands that were holding the rope railing and lifted his arms up while his face looked up to the sky. He was feeling and touching the rainwater. At one point, he opened his mouth to taste it. When the rainwater became less, the teacher stopped and laughed, as both of them had become wet.

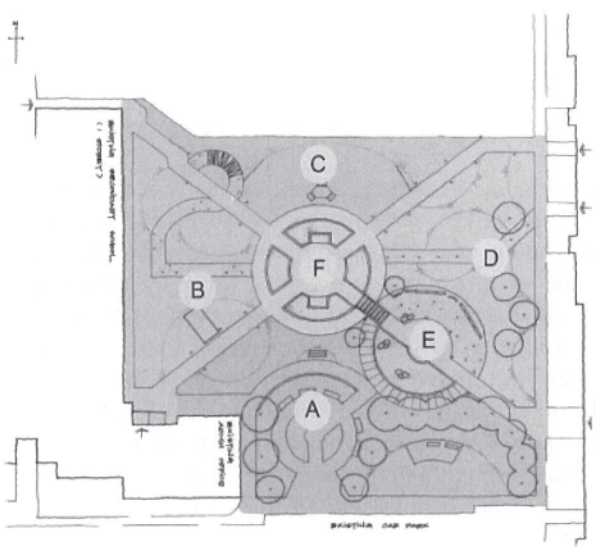
Attributes of sensory experiences would encourage a greater understanding of and exploration by users of a sensory garden and help to fulfil users' needs in terms of their enjoyment of an environment. However, if these needs are not met, users may feel frustrated and even threatened, thus it will add to their fears and apprehension (Kaplan et al., 1998). For example, during one of the observation days at the researcher's case-study site, a partially-sighted student and a student in a wheelchair had a fear of going into the willow tunnel because of the changes in the material as one travels along it. Two teachers had to cheer them on and convince them to walk through the willow tunnel. The following anecdote illustrates how users of the sensory garden utilized the willow tunnel:

> One morning in the observation period, two teachers decided to experience the willow tunnel with one student who was in a wheelchair and one student who was partially-sighted. The two teachers went through the willow tunnel and waited for more than five minutes as both of their students had a fear of going through the tunnel due to the changes in its material on the floor surface. One of the teachers tried to convince both students by saying, '*Come on, Steve...you can do it*!' while the other teacher walked through to the end of the willow tunnel and said, '*Look! I'm here'*. The students looked surprised. Then she walked back through the willow tunnel and cheered on both students to join them. The partially-sighted student put one foot tentatively on the chip-bark surfaces. He then smiled and walked slowly towards his teachers. As he approached, one of the teachers held his hands and said, '*Yes! You've made it!* The other student in his wheelchair was still on the pathway. He looked confidently at his mate and slowly wheeled

his chair onto the bark surface. They continued to cheer him on. As he came closer to them, one of the teachers said, '*Well done, Steve!*' They then engaged with the willow tunnel. One teacher and one student played with some of the artwork displays while the other pair spread their arms wide while feeling the willow. The four of them finally walked towards the end of the willow tunnel and returned back to the pathway. Besides experiencing the attributes at the willow tunnel, it also increased the students' confidence.

RESULTS

The Royal School for the Deaf and Communication Disorders, Cheshire: Multi Sensory Millennium Maze (RSDCD) is a residential, co-educational, non-maintained special school and college. The school hours are from 9am until 3pm, Mondays to Fridays. The students' disabilities range from severe and complex learning difficulties, autism, emotional and behavioral difficulties, multi-sensory impairment to medical, physical and language disorders. The age range is from two to twenty years. The sensory garden, called the Multi Sensory Millennium Maze, was designed in 2000 by Sue Robinson, a landscape architect from Stockport Metropolitan Borough Council. It is situated in the middle of the school, between two buildings. It is a square form: a courtyard with flat topography (see Plan 1). The total area of the garden is 2318 sq. metres.



Plan 1: Plan of the sensory garden, showing the zones and attributes of the RSDCD

The zones were defined as follows:

A. *Parents' Waiting Area* contains eight attributes: two lawn patches, trees, shrubs, pathways, seating, a textured wall and signage.

B. *Exploraway* contains six attributes: three lawn patches, gravel on the path surface, lighting bollards and pathways.

C. *Green Space One* contains seven attributes: lawn patch, scented plants, lighting bollards, seating, a*vaporized trail*, a willow tunnel with bark chip on the path surface and artwork display. *Vaporised trail* was the term used by the landscape architect who designed the sensory garden. It was designed for wheelchair users to offer challenges, with a surface of gravel and limestone blocks.

D. *Green Space Two* contains eleven attributes: six lawn patches, trees, hedges, lighting bollards, pathways and a rubber walk.

E. *Asteroids Arts Garden* contains nine attributes: shrubs, pathways, lighting bollards, balancing beams, boardwalks, gravel, musical instruments, rock sculpture and wood edge.

F. *Water Central Area* contains eight attributes: pathways, a pergola, climbers, raised beds, herbs, scented plants, seating and a water feature.

It was a sunny day and there was a light wind. A group of students with multiple disabilities were ready for the literacy session with their teacher and a few teaching assistants. This weekly session with the students was used to reinforce what they were feeling, smelling, hearing or seeing, in terms of the different sounds and textures offered by the sensory garden. As they were leaving their classroom, they chanted and repeated together, '*We are going out to the garden'*. 'Eileen', who wore leg braces, looked pretty with her pink hair band. She showed excitement on her face by nodding, while 'Hamzah', who was in his wheelchair, clapped his hands while looking up at his teacher.

As a group of teachers and students with multiple disabilities turned left out of the patio doors at the *Parents' Waiting Area*, they reached out to touch the textured wall. The teachers supported the students in doing this, chanting the appropriate words as they explored the wall, *'Fence panel, fence panel... bamboo, bamboo...trellis, trellis... little sticks, little sticks... brush, brush... thick bamboo, thick bamboo...'* The students began to anticipate the sequence of the texture of these attributes.

The group of students and teachers undertaking the literacy session did not use the *Exploraway* because its surface was unsuitable for wheelchair users. However, in a preliminary interview the researcher conducted with Anne Gough in 2006, who is a teacher of children with multi-sensory impairments, she used the trail with 'Jo', who has poor sight. 'Jo' found her way around the sensory

garden very well, using the scent of lavender and, when she smelt it, it reminded her of her mother at home, who had also had it planted in her garden. According to Kaplan (1976), when users encounter familiar attributes, this may encourage easy way-finding.

The students moved over to the willow tunnel. '*Where are we, Hamzah?*' the teacher asked. They went through the tunnel slowly to give the students time to respond to the slight coolness being in the shadows. '*Willow, willow all around... willow, willow all around...,* ' chanted the teachers, while wheeling their students through the willow tunnel. Then they stopped in the middle of the tunnel and played with the artwork display. They touched and felt the artwork. Some hit and heard the sound of rattling decorative cans.

One of the standard multi-sensory curriculum item, which is used by teachers in all special schools, is PECS[1] (Picture Exchange Communication System), which involves showing photographs and finding objects in the sensory garden using touch, hearing, smell and sight. This exercise is beneficial for way finding and identifying significant attributes in the sensory garden. The following anecdotal example illustrates how a speech therapist used the images on the rubber walkway at *Green Space Two*. One afternoon in the observation period, a therapist and a student with speech difficulties were strolling in the sensory garden. When the therapist reached the rubber walkway (see Image 4), she jumped onto one of the images and said, '*Flower!*' Then she jumped from the 'flower' onto a blank space and let the student jump onto the flower image. The student copied what the therapist had done and responded very well. Seeing that the student had behaved positively, the therapist continued jumping onto a series of different images until the end of the walkway.

Image 4: This was where a speech therapist and a student with speech difficulties were recorded using the images on the rubber walkway to encourage verbal communication.

At the *Asteroid Arts Garden*, the teachers stamped their feet over the boardwalk together and chanted, *'Bump, bump, bump over the decking... bump, bump, bump over the decking...*' 'Eileen', who was wearing leg braces, copied what her teacher did. The vibration on the boardwalk stimulated 'Steve', who is visually impaired. Then they moved round to the sand and gravel area to explore these textures while singing, *'Sand between my fingers...sand between*

[1] PECS allows staff and students with autism and other communication difficulties to initiate communication.
Further information on PECS can be obtained at http://www.pecs.org.uk/general/what.htm

my fingers...gritty gravel, gritty gravel...big rocks, big rocks...' The teachers laughed as 'Hamzah', who was in his wheelchair, put his face on the surface of the boulders.

One of the teachers asked the researcher, '*Can you see in his eyes that he is enjoying it?'* The teacher then encouraged her other student, '*Well done! You are feeling the big rocks too, Steve'.*

Next, they moved across to the musical instruments. As they wheeled onto the gravel surface, the sound of the gravel crushing under the wheels and their footsteps could be heard. The group dispersed to each of the musical instruments and made rhythms with the different attributes while singing, *'Knock, knock, knock on the wood, knock, knock, knock on the wood...blow the pipes, blow the pipes... hit the chimes to make a sound, hit the chimes to make a sound...'* 'Steve' loved the feel of the vibration as his teacher hit the different chimes. Other students were then given the opportunity to hit the musical instruments and they responded positively. Then they moved towards the water fountain by going underneath the pergola. *Underneath the pergola, underneath the pergola...,'* the teachers sang at the *Water Central Area*. Everyone grouped around the fountain to hear the water. They chanted in a whisper, '*Can you hear the water trickling? Can you hear the water trickling?*' Some students jumped in their wheelchair while making loud, shrill noises, showing their excitement! The teachers helped the students to feel the water from the fountain by stepping over the shrubs which were planted around the water feature and scooped the water with their hands and whispered again, '*Feel the cool, cool water... feel the cool, cool water...'* and they sprinkled some water onto the students' faces and hands. The students' positive behaviors included licking the water from their hands and then reaching out for more.

Surrounding the *Water Central Area* were raised beds with scented plants. The teachers chanted the names of the herbs, *'Curry plant, curry plant... basil, basil..., mint, mint...'* One of the teachers put some herbs close to 'Hamzah's' nose. He was still, concentrating while his eyes were moving. He smelt the herbs for a while and suddenly grabbed them from his teacher's hand and put some into his mouth. The teacher let him do it and said, *'Do you like it?... Ooh! Yes! It's nice, isn't it?* 'Hamzah' pulled a weird face and spat it out. '*I guess you just like to smell it, don't you?*' giggled the teacher.

All of them then moved as a group to the picnic table where there was some food to taste. '*Snacks at the picnic table, snacks at the picnic table...'* After having their snacks, the teachers said, '*We have finished'* and they signed to their students. *'Do you know our way back to the classroom?'* the teacher asked 'Eileen'. Amazingly, she began to take the lead and, through the use of plants, followed the path back to her classroom's patio. Using sign language, the teacher smiled and patted Eileen's shoulder, *'Well done, Eileen'.*

The main finding showed that students in the case-study preferred to go to the sensory garden with their teachers and peers. The interviews and observation outcomes revealed that students with special educational needs preferred:

i. Zones with a hard surface pathway, allowing accessibility and easy way finding into the sensory garden and back to the school building.

ii. Zones with a variety of attributes that are placed adjacent to the pathway, which offered users to easily engage with it, thus afforded them a richness of activities in the sensory garden.

CONCLUSION

It is evident from the case-study example that children's engagement with multi-sensory environments encourages sensory stimulation, social interaction and behavioral changes. Users appeared to feel a physical attraction to and affection for the sensory garden as their educational outdoor space. This was reflected in their behavior changes, such as feeling fascinated while engaging with familiar attributes or feeling a sense of fear and trying to escape from being in contact with animals or plants, which they think have negative threats in the sensory garden. The observed positive developments are also important in their outdoor environmental education, for example, natural elements found in the school setting, afforded easy way finding, they generated activities and brought back memories of being at home. Thus, the children recognized the functional properties of their outdoor environment. Therefore, the variety of attributes and good circulation network were the properties of the sensory garden that afforded users the opportunity to undertake a variety of activities.

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