

Tactile and Sensory Textiles for Children and Babies with Visual Or Multi-Sensory Impairment

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Abstract: There are a growing number of children and babies diagnosed with multi sensory disability and visual impairment. Developing and stimulating these children is often done in Multi Sensory rooms in schools and hospitals where the child can experience visual, tactile, olfactory, auditory, motor, cognitive and communicatory toys and products. Many of these aids use plastic coatings for ease of cleaning between multiple users but have limited textures, however the work reported here investigates the role of textiles as a learning aid, exploring different surfaces and effects to enhance the tactile sensations of an object and concluding in a ball being designed and developed almost entirely from textiles. The techniques and technology included in the product are; UV florescent dyestuffs, 'Shibori' technique, colour changing fibre optics, retro reflective materials and microencapsulated aroma and anti-bacterial technology. A limited case study has been undertaken and demonstrates the success of the product. The use of texture, light and aroma together with movement gives a lot of stimulation to a child. Teachers involved with the project gave positive feedback on how the child responded.

Keywords: Textiles, sensory impairment, colour therapy.

"It is hard for a child to cope with the problem of blindness if his resources are limited due to mental retardation. It is extremely difficult for a child to cope with mental retardation if his resources are limited on account of blindness. And these problems are magnified many times for each additional handicap also present, for example spasticity, epilepsy and hearing impairment" [1].

1. Multi Sensory and Visual Impairment

There are an estimated 25,000 children with sight problems in the UK, (VA <6/12 as a measure of acuity), about 12,000 of these children also have other disabilities[2]. Estimates are based on a number of studies which include those using visual acuity (VA) measures to define the level of sight problem(s). Two common definitions to identify the population of people with significant sight loss are:

- sight loss that would meet the criteria for registration as blind or partially sighted or VA less than 6/18; and
- sight loss that would not qualify for registration but significantly affects everyday life, or VA less than 6/12.

Visual acuity of 6/24 means a person can see at six metres what a fully sighted person can normally see at 24 metres. In the UK someone who has visual acuity of 6/18 or worse can be registered as having a sight impairment (partially sighted) if they also have a significant field loss [3]. The problems they face are exacerbated by other disabilities ranging from hearing problems to learning difficulties.

Research in the UK has consistently shown that a substantial proportion of children with visual impairment have additional disabilities/needs [4,5]. Some 30% were classified as having severe or profound and multiple learning difficulties in addition to a visual impairment, while the remaining 20% had additional disabilities excluding severe or profound learning difficulties. A study by Rahi et al [5] identified 77% of children newly diagnosed with severe visual impairment or blindness had additional non-ophthalmic disorders or impairments.

Multi sensory impairment cannot be boxed and given an exact list of causes, treatments or symptoms. It is a case of studying each individual child and giving them an individual diagnosis and treatment. It may be assumed that all children have visual impairment due to a problem with their eyes, however this is not the case. Some children have a blockage in the channel sending the information from the eye to the brain. With this information being translated incorrectly (if at all) the child will not be seeing what they think they are seeing, and combining this with learning difficulties the impairment is multiplied leading to a complex disability. Spatial awareness problems are a symptom of multi sensory impairment. A child with multi

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sensory impairment does not comprehend distance. To them a room is very small, and everything within it is a few centimetres from their face. This is very distressing when they cannot reach something they want to touch, or play with. Children with multi sensory disability have so many aspects to their disability that it is important to understand as much of it as possible before making a piece of equipment to aid their learning. It is very important therefore that when a toy or piece of equipment is being designed the child should almost always be able to reach it.

Visual impairment has varying degrees of extremity ranging from text needing to be enlarged, not seeing facial features clearly and including only seeing blocks of colour. In extreme cases a child can only see from light to dark. Total blindness is extremely rare. The vision of visually impaired child is unique to them, and because of this it is impossible to give a detailed explanation of how a visually impaired child experiences sight.

A visually impaired child carrying out their daily routine, or learning something new in the classroom can suffer from fatigue due to the eyes being over stimulated. Small breaks and allowing the child rest between sessions can improve concentration throughout the day enabling them to complete tasks and to be a more productive student. Another cause of fatigue during the day is due to a lack of nighttime sleep. Visually able children know to sleep at night because they tire when it is dark, whereas for a child with visual impairment they do not differentiate between day and night so easily, therefore find it harder to sleep. Parents sometimes hear their child talking, babbling or playing all throughout the night.

Visually impaired babies develop very differently to children with no disabilities. Four or five months after conception, the foetus without any disabilities will be learning to move and what the consequences of those movements are. For example pushing legs out would mean other parts of the body hit the walls of the womb, and if they put a hand in their mouth then they can suck. Healthy newborn babies have already developed motor skills and as they grow learn new textures, pressure needed to move objects, varying noises and vibrations. The experiences and knowledge builds up in their memories, enabling the child to walk, talk and fasten clothes when they are developed. "While still a foetus, he also had auditory experiences" [6], a baby is experiencing the world before they are born, and this could lead to the question of 'how much does a foetus learn?' When a child is new born they do not understand where noise or vibration come from. The first time a sound is produced it would cause the baby

confusion, however after two weeks the child realises that by crying they get attention. Newborn babies will often play with their own hands. This is because, they do not know what they are, but would understand that they chose the time period for play, and because with each new background, the hand playing becomes a whole new experience.

Developing kinaesthetic sense is the main achievement made through combinations of tactile, visual and auditory experiences. Comparing these experiences with a newborn that has sensory disabilities a difference in development is clear. No strong visual stimulation to encourage the child to improve motor skills leads to the child becoming passive and immobile quickly. Adults often move the child's hand to encourage grasping of objects. This is not helpful, kinaesthetic sense is development by movement performed by the child, under their own force.

Blind children with no spatial awareness often perceive themselves as alone in the world. Most children learn that the sounds being created were made by themselves, and this developed their object placement, and sequence games skills develop spatial awareness. Objects therefore must be different textures, colours, temperatures, size and shape. Stimulating the child's sense of smell and sound are also of high importance [7].

2. Multi Sensory Play

Multi sensorial play is an integral part of a child's learning, and is especially important for babies and children with multi sensory impairments, because it gives them the opportunity to utilize their senses that function well. It also retains or develops the level of usage in the impaired senses. Multi sensory rooms are ideal environments for this play to be carried out, also known as 'Snoozelen' rooms, they are well equipped with state of the art electronic technology such as fibre optics, LED's, sensors that are touch or sound sensitive and ultra violet lights, Figure 1.

The use of new technologies and sensors give the child more choice of product, and so potentially the child could develop new skills of a higher level. It is important that more than one sense is stimulated during each session in the multi sensory rooms, to aid development and hold the child's attention. A school would often aim for a child to experience the multi sensory room everyday for around twenty minutes [8]. In that time a range of activities and games would take place such as counting games, cause and effects games