Resource Manual for Children with Communication Disorders (3 – 8 Years) on Multisensory Skills

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Abstract

Multi-sensory instruction refers to any learning activity that includes the use of two or more modalities to receive or express information. Children with communication disorders often demonstrate deficits in one or more sensory modalities. Multisensory approach capitalizes on their strengths to stimulate learning by engaging students on multiple levels. The sensory modalities often focused in multisensory training include visual, auditory, tactile, kinesthetic and olfactory modalities. In India, where there is a large population of persons with communication disorders, such a training package is not available in any of the languages. Speech therapists and parents involved in treating children with communication disorders do not have access to any ready-made material that incorporates a multisensory approach. Hence, there is a need to develop a resource manual that acts as a guide and enables the therapist and parents / caregivers to improve or train multisensory skills in children with communication disorders. The manual is one of the first attempts at helping parents and caregivers help their children develop multisensory skills. The structure of the manual has been so arranged so as to facilitate the parents/caregivers to first assess their child's sensory strengths and weakness in various senses. The assessment has been made easy through a simple questionnaire that assesses the various sensory skills. This will give the parent/caregivers a good idea about which sensory skill is lacking/deficient and needs to be worked upon. They can move onto the appropriate sections in the subsequent part to develop/improvise the respective sensory skill using activities and suggestions in the section.

Key words: multisensory approach, communication disorder, manual, training package, multi-sensory skills

Multisensory training approach is a model of language instruction which holds that learning or acquiring knowledge and skills in given subject areas is best facilitated by involving more than one of learners' senses (McIntyre & Pickering, 1995). The sensory modalities which are often focused in multisensory training include visual, auditory, tactile, kinaesthetic and olfactory. Multisensory approach is used to facilitate a person's ability to learn and recall information by combining explicit information and multisensory strategies. Multisensory approach is the most effective teaching method for some groups of children with different disabilities. Using a multisensory approach with children helps in channelizing more appropriately the information to be learnt by them to the brain and this in turn facilitates learning.

Studies in the domain of cognitive psychology show that there are both cooperative functions of the senses and disruptive and inhibitory effects of one sensory system upon another. It is important, therefore, to use all of the child's senses while teaching him/her a new concept. However, empirical studies about sensory and motor development in children with autism are limited compared to studies of other aspects of development. Empirical evidence converges to confirm the existence of sensory and motor difficulties in many children with autism at some point in their early development (Ornitz, Guthrie & Farley, 1977; Ohta, Nagai, Hara & Sasaki, 1987; Dahlgren & Gilberg,1989; Scharre & Creedon, 1992; Baranek, 1999). Reviewing sensory and motor impairments for children with autism, Baranek (2002) maintained that current evidence supports a correlation between sensory symptoms and Autism Spectrum Disorders (ASD), specifically a tendency for individuals with ASD to exhibit under- and over arousal in response to sensory stimuli.

Sensory integration theory emerged at the same time that therapies aimed at individuals with learning disabilities were increasing. The definition of the term *learning disabilities,* introduced by Kirk in 1962, gave rise to assessments and treatments based on suspected sensory-processing, such as the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy & Kirk, 1968), psycholinguistic approaches, and a myriad of perceptual motor interventions (Barsch, 1967; Delacato, 1963; Doman, Spitz, Zucman, Delecato & Doman, 1960; Frostig & Horne, 1964; Getman, Kane, Halgren & McKee, 1964).

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Like sensory integration theory, the work of Doman et al., (1960) was based on the theory that individual development follows an evolutionary process. The National Research Council (2001) recognized that sensory integration therapy contains components of scaffolding, child-centred approach, meaningful and appropriate play. The increasing number of rooms for multisensory training across American educational settings (Hogg, Cavet, Lambe & Smeddle, 2001) stands in favour of sensory integration. Such rooms also called Snoezelen rooms have been used extensively in individuals with profound and severe physical and mental disabilities, as well as with individuals with autism, dementia, and traumatic brain injury. Here gentle stimulation of the primary senses of touch, taste, sight, sound and smell are provided to the individual to gain experience of autonomous discovery and to react and respond with no declared aims or purpose.

Many comprehensive educational models have also been developed for children with different communication impairments. For children with autism, the TEACCH program that includes a sensory processing or motor development component has been proposed. For children with developmental apraxia of speech there have been several multisensory approaches to treatment such as the association method, sensory motor approach and so on. For children with learning disability, several multisensory training programs have been proposed and studies have been conducted to examine their efficacy and advantages over other forms of treatment. Thorpe and Bordon (1985) discussed the visual, auditory and kinesthetic importance when learning the sound to symbol relationship for reading and spelling. Anselmo and Kulp (1997) conducted a study to see if a multi-instructional program would increase the pre-reading skills of kindergarten children who were at risk. Their findings suggested that there was an impact on the student's ability to identify initial consonant sounds using multi-sensory approach. The students did not show a growth in their abilities to identify or match corresponding upper and lower case letters when following the multi- sensory instructional intervention.

The investigators recommended that a multi-sensory instructional program be used with kindergarten children so that their reading readiness is better achieved by first grade. The Orton Gillingham Method and the Visual-auditory-kinesthetic-tactile method also utilize multi-sensory stimulation to teach children with learning disability. As mentioned earlier, the Association method developed by McGinnis and Pribram (1980) believes that the essential processes of learning attention, retention and recall has to be integrated to acquire automaticity of language. The investigator reports that such a multi-sensory form of instruction is effective not only for children with developmental apraxia of speech but also children with profound mental retardation, autism, cerebral palsy, traumatic brain injury and dyslexia.

With the limited review of literature that is available, it follows that multi-sensory instruction is fast becoming a popular method of intervention. For any child to develop communication through the multi-sensory form of instruction, she/he must have better functioning sensory abilities. Visual, auditory, kinesthetic, tactile, olfactory and gustatory modes are used as the input senses to teach language. Hence, it is obvious that these senses need to function at their optimum best both physically and cognitively.

There are very limited multisensory training packages, comprehensive, ready-to-use manuals to guide the parents / caregivers in the development of these multisensory abilities in their children who are diagnosed as having various communication disorders available in published forms. There have been many articles on integrated classroom and the advantages of such a set up. However, the child will never be able to utilize them all unless she /he has the readiness in her/him to receive the instruction. Thus there is a need for a manual that incorporates all these features to be introduced in the Indian context.

Method

The purpose of this study was to develop a resource manual to develop multisensory abilities in children with developmental disabilities between the age group of 3 to 8 years. The manual is intended to be used by clinician and caregivers of children with developmental disabilities. The manual was prepared in stages and there were five major stages as described below:

Stage 1

A. A compilation of available information was done based on web search and other available actual resource materials. Various centres that offer training in specific sensory modalities were also researched and a note of the modalities addressed along with how each of them was addressed was also carried out. This yielded a fairly good idea of what already exists in different Indian languages.

B. Based on the literature review, the drawbacks and lacunae in training children in sensory modalities were noted. This helped in identifying the constituents of the manual and additional requirements to be met. The outline and structure of the resource manual was

developed. The manual was planned to include five sensory domains of visual, auditory, tactile-kinaesthetic- proprioceptive, olfactory and gustatory.

Stage 2

The manual was prepared with the resource materials for all the five sensory domains. Table 1 and Figure 1 and 2 show the overall structure of the manual developed in English language.

The manual has been organized in a very simple and user-friendly way so that any individual who wishes to use the manual is able to follow it. It has been proposed in English. The manual focuses on developing skills in five major modalities in children between the age range of 3 – 8 years. Each of the modalities comprise of several skills, each of which are addressed in the manual. The manual is therefore broadly divided into five main sections as follows:

A)Visual
B) Auditory
C)Tactile, kinesthetic and proprioceptive
D)Olfactory
E)Gustatory

Within each of the modalities a number of skills are included (see appendix). Each modality consisted of a simple and easy-to-administer questionnaire that tests the abilities of the child for various skills that fall under the modality. Questions that target each of the skills individually and help identify the child's level of functioning in a particular skill have been included in the questionnaire. For e.g., in part I of visual modality, questions that assess the child's ability for visual discrimination, form constancy etc. are included under the respective skill-headings.

The second part in each modality consists of activities to improve the skills that the child does not have or has not mastered completely. Here again, each skill has been individually addressed through activities. This part further consists of definition of what the skill is and how it is important for the child, instructions to carry out the activity, type of activities to establish/improvise the skill and suggestions for home training.

Each of the sections has been organized in a similar fashion. However, for certain skills where the activity cannot be represented in the book/ manual, suggestions to carry out the same has been given through elaborate descriptions.

Stage 3

A. The material developed in stage 1 was subjected to familiarity rating by typically developing children in the age group of 3 to 8 years. The material was tested for familiarity, ambiguity of pictures, clarity of audio recording, comprehension of instructions, scoring procedures and ease of use of material.

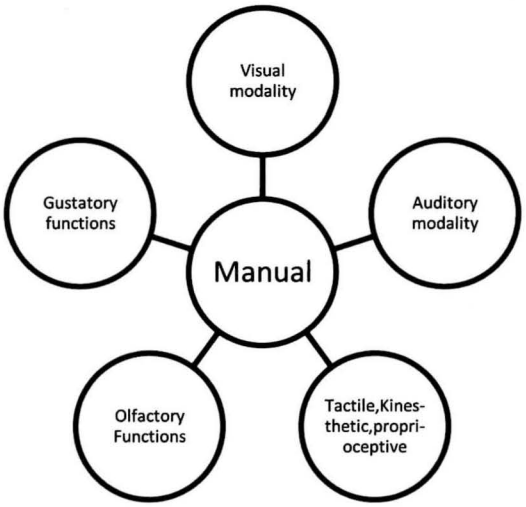

Figure 1. *Overall structure.*

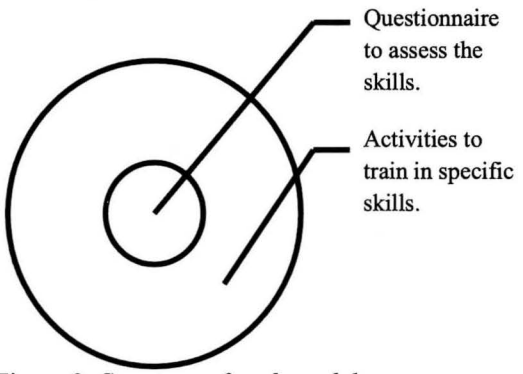

Figure 2. *Structure of each module.*

B. The material was subjected to item/ content validity by giving the same to three experienced speech-language pathologists with a minimum experience of three years. Each activity includes appropriate instructions, resource material and scoring procedure wherever required.

Stage 4

Based on the results obtained in stage 2, suitable modifications were incorporated in the manual for each domain. These modifications were in terms of increasing/reducing the size of the picture and incorporating pictures that related more to the Indian context and substitution of two pictures which were felt to be ambiguous.

Stage 5

The manual was administered on three children with Autism, Expressive language disorder and Learning disability respectively. All these children were between the age range of 3 – 8 years. The parents (mothers) of these children were literate (minimum education of 10th standard) and could read and understand English. Feedback was obtained from these mothers which was rated on a three point rating scale for familiarity of pictures and photos used in the manual, comprehension of instructions, ease of administering the questionnaire to understand the specific deficit in the respective sensory domain and ease of carrying out the activities suggested in each of the subskills of the respective sensory domain. The items / skills which were rated low by the mothers were further probed into to obtain a description of the actual error/opinion.

Stage 6

Based on the feedback obtained from the parents (mothers) suitable modifications were incorporated in the manual and the manual was finally printed.

Who can use the manual?

The manual has been designed for clinicians and parents/caretakers alike. Clinicians working with children having communication disorders and parents/caretakers who are bringing up children with communication disorders can avail the best out of this manual by following instructions given at the beginning of every section.

Suggestions and Guidelines for users

Both the parts of the manual, namely questionnaire and the section on therapy activities have an instruction set preceding them for each modality. This means that at the beginning of every questionnaire and activity section there is an instruction set for the user (clinician/ parent/ caretaker). All that the user has to do is to follow the instructions given prior to each section. Caretaker/ parent/ clinician are highly encouraged to be creative when administering the manual and the activities can be shaped in a way to suit the child's interests by using appropriate items.

Implication of the manual

The manual is one the few attempts at helping parents and caregivers help their children develop multisensory skills. The structure of the manual has been so arranged so as to facilitate the parents/ caregivers to first assess their child's sensory strengths and weakness in various senses. The assessment has been made easy through a simple questionnaire that assesses the various sensory skills.

The manual has a provision to evaluate as well as develop sensory skills in various modalities. It plays in preparing the child to learn language both receptive and expressive. Sensory readiness as a prerequisite to learning language has often been emphasized in the literature and is also being touted as essential to schooling. Typically developing children who seem to acquire such a form of readiness naturally without any specific intervention of any sort demonstrate the usage of such sensory skills in their classroom learning as well as other communicative situations.

Certain developmental disorders such as autism, profound mental retardation etc. are characterized by very severe sensory impairments in specific sensory modalities that come in way of learning to communicate. These sensory skills when developed and when unwanted sensory behaviours are eliminated can facilitate language therapy and language learning on part of the child. The child will be in a better position to explore her/his environment and learn things better and retain them too.

Many a time olfactory and gustatory skills are ignored and grouped as the child's likes and dislikes. However, there may be more serious sensory issues that need to be addressed. This manual takes into account little consistent behaviours that indicate sensory issues in the child.

The manual will also help the child to retain what she/he goes onto learn in a better manner as indicated by some research studies that support multi-sensory instruction. The manual when administered also indirectly helps achieve the concept of an integrated classroom in its truest sense by enabling children with developmental disabilities to be equal to their counterparts in sensory abilities thereby reducing a huge burden on them in terms of coping with peers. The manual developed keeping the Indian population in mind addresses the need for a multisensory training manual for children with developmental disabilities in India.

Limitations

The questionnaires that assess the visual and auditory skills have been developed keeping the developmental milestone of particular skills in mind. However, the questionnaires of the tactile, kinesthetic, proprioceptive, olfactory and gustatory modalities have been developed keeping the unwanted

/abnormal behaviours in mind. Thus the caregiver/clinician must be cautious when using them. The activities under each modality are not proportionate. More number of activities has been proposed under the visual, auditory and tactile modalities as compared to the gustatory and olfactory modalities.

Future recommendations

The manual needs to be validated on more number of subjects with various developmental disorders and tested for content/ item validity. Based on this, suitable changes/modifications need to be incorporated. Once the manual is run on different types of developmental disabilities and on more number of subjects it needs to be seen whether such a form of multisensory stimulation has differential effects on different disabilities and if so, what the differences would be. More number of activities to develop the olfactory and gustatory modalities need to be added to overcome the disparity in the number of activities suggested. The manual needs to be translated into other Indian languages so that it is accessible to more caregivers who are from different language backgrounds.

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APPENDIX

Details of subskills of each sensory domain for which activities are suggested

Number of sub skills	SENSORY MODALITIES				
	Visual	Auditory	Tactile-Kinesthetic – Proprioceptive	Olfactory	Gustatory
	Visual Awareness	Awareness of sound	Tactile Awareness	Hypersensitivity to Smells (Over-Responsive)	Hypersensitivity to Oral Input (Oral Defensiveness)
	Visual discrimination	Early listening -- -- talking loop	Tactile Hypersensitivity	Hyposensitivity to Smells (Under-Responsive)	Hyposensitivity to oral and gustatory input (Under-Registers)
	Visual memory and recall	Association of sound with meaning	Tactile Hyposensitivity	Olfactory identification	Gustatory identification
	Visual closure	Localization Skills	Tactile Perception and Discrimination	...	...
	Visual figure ground discrimination	Auditory Discrimination	Hypersensitivity to Movement (Over-Responsive)	...	...
	Form constancy	Distance and Directional Listening	Hyposensitivity to Movement (Under-Responsive)	...	...
	Position in space	Auditory – foreground background discrimination	Poor Muscle Tone and/or Coordination	...	...
	Depth perception	Auditory Memory and Sequencing	Proprioceptive dysfunction-Sensory Seeking Behaviours	...	...
	Visual Sequencing	Auditory Closure	Proprioceptive dysfunction-Grading Of Movement	...	...
	Visual Seriation	...	...	...	...
	Part/Whole and Whole /Part Relationships	...	...	...	...
	Colour perception and colour constancy	...	...	...	...
	Visual conceptualizing	...	...	...	...
	Visual pattern-following	...	...	...	...
	Visual analysis and synthesis	...	...	...	...