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CHAPTER TWELVE

TOWARDS APPROPRIATE SENSORY PRODUCTS FOR LEARNERS WITH LEARNING PROBLEMS: A CASE STUDY-BASED REVIEW

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Introduction

Children with learning problems (LP)¹ experience learning differently in the classroom environment (Speece, Case and Molloy 2003) and may require an adapted curricula and form of assessment. LP may be caused by a genetic predisposition, prenatal injury and/or various neurological and other general medical conditions.

Bradley, Danielson and Hallahan (2002) as well as McNamara (2004) advocate the early identification of children with LP, ideally within the primary grades in order to improve treatment effectiveness. Play is one of the interventions that a remedial teacher may introduce into a classroom. During play, children often use inanimate objects rather than verbal utterances to convey their feelings, beliefs and perceptions about themselves and their world (Schoeman and Van der Merwe 1996). Teachers involved with special education help these children through intervention strategies once LP has been identified. A wide variety of mediums, which can include interaction with educational toys, can be used as intervention strategies in a classroom or playroom environment. Luckin, Connolly, Plowman and Airey (2003) reported that interactive toy technology has the potential to stimulate children with LP. Two separate studies highlighted the need for developing interactive toys. These studies found that children with developmental disabilities respond better to these types of toys during play sessions (Bambara, Spiegel-McGill, Shores and Fox 1984; Hsieh 2008).

The term sensory product (SP) in this chapter refers to an interactive

product aimed at combining the different sensory actions of a child. These sensory actions are seeing, hearing, smelling, touching and tasting.

Guidelines for Developing a Sensory Product

A literature review identified design, ergonomic and end-user variables that a designer must consider when developing an SP. These variables guided the design and development of the SP. These variables are discussed below.

Design Variables

Illustrations, language, colour, layout, typography and visual appearance are design factors that influence the development of children's books. Illustrations are the main component of most children's books. Illustrations aimed at children are classified into four main categories: representational illustrations, imagery to generate mental pictures, spatial pictures and mnemonic illustrations (Mastropieri, Scruggs, Bakken and Whedon 1996).

Scholars suggest mnemonic illustrations for children with LP. Mnemonic illustrations are intended to facilitate memory of key vocabulary or content information from reading materials and make use of the keyword, pegword and letter strategies (Mastropieri et al. 1996). Mnemonic illustrations enhance recall and inference (Scruggs and Mastropieri 1989; Scruggs and Mastropieri 1992; Mastropieri, Sweda and Scruggs 2000), foster learning of new facts or vocabulary (Mastropieri and Scruggs 1989) and improve recall and comprehension tasks (Mastropieri, Scruggs and Fulk 1990).

Botha (2008) identified broad guidelines for illustrations by using Hugo's (2002) grading model.² These guidelines suggest that pictures should be realistic, they should agree with the content of the text, arrows and lines should direct attention to a specific item and text should provide information regarding the illustrations. Colour illustrations should emphasise importance; there should be captions; legends should be explanatory, instructive and comprehensible; text may not flow over illustrations and illustrations should be suitable for the specific target group.

Language Use

All children's books include language to convey a storyline together with the illustrations. Language within an SP should be consistent on all the pages to reduce confusion and misunderstanding (Mencap 2007). Botha

(2008) also identified several key elements regarding language. Text must consist of short words, preferably one to two syllables. The sentences must be short with one idea per sentence with simple grammatical structures and punctuation. The best option is short paragraphs with only one idea per paragraph and text written in the active voice. Difficult concepts should be explained by using familiar, everyday words, text should be written in the third person and the use of numbers is preferable to using words.

The Use of Colour

Colour is capable of enhancing communication by adding clarity and impact to a message and is essential to convey information that is critical to the contents in the visual offer of information, for example, as with species of butterflies (Pettersen 2002). Young children have difficulty in establishing conceptual representations of colour sensations (Pitchford and Mullen 2001; Sabbotsky 1997). They learn colour terms at a later developmental stage, for example, labels for familiar objects (Pitchford 2006; Pitchford and Mullen 2001). It is, therefore, recommended using only the eleven Universal Colour Categories when designing SP.

The use of colour can be an effective remedial tool to remediate reversal problems (Bannatyne 1971; Hammil and Bartel 1978), to assist in organising information (Pettersen 2002) and to improve attention for students with Attention Deficit Hyperactive Disorder (ADHD) (Swanson, Barlow and Kinsbourne 1979; Zentall, Zentall and Booth 1978). Scholars recommend different methods for remediating reversal problems, for example using colour-coded letters as cues. Some systems colour code only the vowels (Bannatyne 1971), while others such as Bannatyne's Psycholinguistic Color System (PCS) lean more towards a phonics approach and colour-coded phonemes (Hammil and Bartel, 1978). Although most studies found that this remediating tool is effective, Doyle (1982) found that colour was less effective than simply practising the same words without colour-coded cues.

A colour-related emotion can be positive or negative depending on a child's personal experience of a specific colour (Boyatzis and Varghese 1993), a child's feelings towards the topic of the drawing (Winston, Kenyon, Stewardson and Lepine 1995), cultural conventions (Zentner 2001) and gender (Deaver 2009; White 1998).

Winston et al.'s study (1995) found that children of all ages use black to complete negatively characterised topics, and primary colours to complete positively characterised topics. The colour red is associated with anger, aggression and excitement; green with quietness and with being withdrawn

(Boyatzis and Varghese 1993); black and other dark colours with depression or anxiety (Birren 1978; Sharpe 1974; Winston et al. 1995). Boyatzis and Varghese's (1993) study, on the contrary, found that the colour black evoked a positive reaction from nearly half of the children they tested and that boys had more positive emotional reactions to dark colours.

Layout, Typography and Visual Appearance

Lexia, a free sans serif font, is recommended for children with LP (SchwabLearning.org 2007). This font includes a non-symmetrical b and d (i.e. the b does not look like a backwards d), and handwritten forms of the a and the g, which readers may recognise more easily. Designers must also consider the cover design, the use of white space (Morris 2001), contrast between print and chapter, a consistent layout, language and visual appeal (Botha 2008), a central theme, and carefully placed pictures to form a whole (Petterson 2002).

Themes and Sensory Actions

Theme choices for children's books are typically determined by the gender of the child (Donovan, Smolkin and Lomax 2000). Considering the animal and insect kingdom, male gender topic books would most likely be about spiders and snakes, whereas female gender topic books would most likely be about baby animals and animals such as horses. Songs, rhymes, chants, musical games and lullabies are ideal to teach young children social, language, motor and emotional skills (Grasso, Allison, Button and Sawyer 1999).

Miller and Church (2003) recommend the incorporation of texture and/or tactile stimulation by using pieces of textured material, rotating chapter wheels, doors, flaps and cut-outs in the book, or producing books that are made of a textured material or chapter. Preschoolers may improve their hand-eye coordination through the use of such materials. Tactile materials hold an appeal for curious preschoolers who are ready for new adventures (Miller and Church 2003). According to Taylor, Morris and Rogers (1997), puzzles are suitable for young, school-age children. Puzzles also provide visual discrimination practise and hand-eye control. Pop-up books consist of movable, three-dimensional illustrations, rotating wheels, doors, flaps and cut-outs. The formats of these books encourage hands-on interaction and involvement and encourage reading with expression, enthusiasm and physical movement (Kurkjian, Livingston, Henkes, Sabuda and Yee 2005).

A comprehensive pop-up book may, however, be overwhelming for a young learner and this would also be true of a complex storyline (Kurkjian et al. 2005).

Dales's (2007) checklist for pop-up books indicates that moveable parts must enhance the text and that it must assist the reader to construct meaning beyond what could be communicated in two dimensions.

The Centre for Assistive Technology (2008) lists various elements that developers must consider when developing devices for children with disabilities. These are the size of the surface "target" that a child must activate, the amount of force required to activate a switch, the positioning of a switch and the travel distance of a switch. Feedback can be tactile and/or auditory.

Different materials such as textured materials, wooden blocks and the movement of solid objects can improve hand-eye coordination. Rhythmic instruments such as rhythm sticks, triangle cutting, colouring, writing and the threading of beads facilitate perceptual-motor coordination. Preschoolers develop their creative problem-solving skills and increase hand-eye coordination through the use of such materials and instruments (Miller and Church 2003). Tanner (2001) remarked that an elementary music programme will provide assistance in the perceptual-motor coordination of learners with various LDs. Kemper and Danhauer (2005) and Kennelly and Brien-Elliott (2001) found that music can be a beneficial therapeutic medium as it plays an integral role in the stimulation and development of children. Sound and/or music can be incorporated into SPs through electronic means and is played to the "reader" via the pressing of buttons.

Several researchers have noted the multiple benefits of using an interactive format when reading aloud to children (Copenhaver 2001; Sipe 2000). Read-alouds can develop children's ability to reason for themselves as well as reason with others (Dickinson and Smith 1994). Interactive and read-aloud books also produce greater gains in work with learners in special education (Englert, Tarrant, Mariage and Oxer 1994; Mariage 1995).

Children's Senses

O'Neill and Chong (2001) found that children become increasingly aware of and articulate about their sensory functioning between the ages of four and seven. Seven-year-olds usually have a fairly detailed and accurate reflective knowledge about the functioning of their senses (Weinberger and Bushnell 1994), but even if they can perceptually identify and label relevant

body parts, they may not have a working understanding of those body parts and their functions (O'Neill and Chong 2001).

Interactive toys can create difficulty if they are not appropriate for the child's developmental level. Some of these are poor quality of feedback to children, negative effects upon children's imagination, problems in children's socialisation, and children's concerns about whether the toys are "alive" (Oravec 2000). It is, therefore, necessary to consider the factors identified by Johnson and Smolen (1995) to ensure that a toy is developmentally appropriate for a child's age. These are (1) providing involvement, concentration and an element of chance which require certain skills; (2) some electric current can be incorporated, but not enough to overheat and result in burns; (3) children's school experiences must be expanded; (4) it must promote interest and facilitate an individual child's skills, and (5) it must foster solo and group play.

A study conducted by Zimmer and Zimmer (1978) as well as a later study by Hubley (1994) suggested that illustrations must be adapted to fit the cultural and visual literacy profile of the target group. "Ethnovisual" and "sociovisual" elements of graphic design and illustrations must be appropriate to the target market (Schiffman 1995; Hugo 2002). Using animals in SPs could eliminate culture-specific objects if a product is used across cultures.

The Development of the SP

The variables highlighted above guided the development of the SP.

The prototype SP consists of an electronic unit (manufactured through rapid prototyping) and an interactive read-aloud book that fits inside the electronic unit. A computer assisted drawing of the electronic unit is illustrated in Figure 1 and contains the following:

- A sound board with colour-coded buttons that are linked to the six animal sounds and two songs. The colour-coded buttons are included in the book and teach children colour association (for example: Press the RED button to hear the animal sound of a Rhinoceros).
- A card reader slot for future expansion.
- A speaker with adjustable volume.
- An on/off button underneath the speaker.
- A grip handle and a wall-mounting point on the back.



Figure 1: The electronic unit of the SP.

Interactive and Read-aloud Book

The children's book (which may be seen in Figure 3) is an interactive read-aloud book. This book contains illustrations, pop-ups, textures that children can feel, flaps that lift up, a rotating wheel, a slide mechanism, puzzles, arrows that provide visual cues, a font which is easy to read, a lesson to the story and colour association between text and the buttons on the electronic unit. There are also two songs (one of which the notation of is illustrated in Figure 2) for the sing-along which portray friendship, the essence of the story.

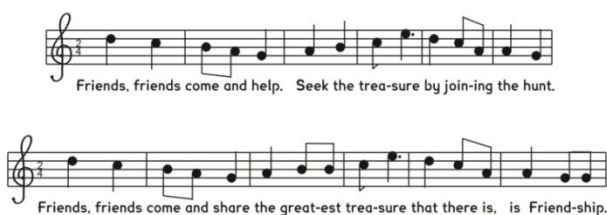


Figure 2. One of the friendship songs.

The children's story is about zoo animals going on a treasure hunt. The primary storyteller is Rusty the Rhinoceros and he invites the children to read the story with him. The story starts with animals having a normal day in the zoo when a parrot comes to give them the exiting news of a treasure map. The animals decide to escape from the zoo in order to go on the treasure hunt. Along the way, they meet several other animals, including two Walhalla bears. After a long treasure hunt, they find the treasure chest,

and when they open it, they find nothing inside. The zoo animals then realise that the greatest treasure in the world is friendship.



Figure 3. The interactive read-aloud book fitted inside the electronic unit.

Testing Phase

A sample of children, under the guidance of their teacher, used the SP in a classroom situation. A series of questions determined the children's interaction and experiences with the SP. A remedial teacher and an occupational therapist assisted with developing the questionnaire. They identified relevant questions, suitable for the age group that used the SP, concerning matters such as (1) why the child paged through the SP, (2) whether the child enjoyed the storybook, (3) which elements the child liked the most together with a reason, (4) what the child learned from the story, (5) how the child may or will use what he or she has learned from the story, and (6) whether the child would like to page through similar books. The teachers provided feedback on the interaction between the child and the SP. The testing phase also identified additional suitable story themes. The aim

of this tool is the identification of the most suitable story themes for children in Grades 1 and 2.

Permission to Conduct Research

The Department of Education in the Free State, South Africa, granted permission to use children as test subjects.

Selection of the Schools

Forty-five primary schools served as the population for this study. These schools are in, or near, the centre of Bloemfontein, South Africa, and exclude rural and peri-urban schools. Four primary schools served as the initial sample. The selected school represented the population of South African primary school children. Only two schools granted permission to use their children and the parents of these children gave permission for their children to participate in the study.

Selection Process of children

Twenty-four male and eighteen female children from Grades 1 and 2, identified by the schools' remedial teachers, participated in the study. The children were between six and nine years of age and all suffered from LP. The children received their schooling in English, their second language.

Method

A remedial teacher, the primary storyteller at School A, placed three children at a time next to a low table on which she placed the SP. The children could look and page through the SP if they so desired. Two remedial teachers sat at the back of the class and observed the interaction of the children with the SP. The primary storyteller handled the SP, read the story and included the children in the different activities. These consisted of pushing the buttons to activate the sound element, singing along with the song, playing the triangle, pulling the flaps and feeling the different textures. The three remedial teachers interviewed each child after the session and recorded each child's response.

The process at School B was similar except that there was only one remedial teacher that assisted with the testing. The remedial teacher individually interviewed the children after the interactive sessions.

The Results

Children's Interaction with the Sensory Product

The results of the children's interaction and experience are presented in Table 1.

The Results from School A

Only one child did not want to page through the SP. The colourful illustrations caught the attention of several of the children and they were able to identify the animals. This group of children enjoyed the sing-along and the animal sounds the most. Most of the children ($n = 16$) understood the essence of the story. One child did not answer the question "which element was the most likeable?" whereas other children provided one or more answers. The children enjoyed the book and identified the sound element as the most likeable. The reading factor received the least attention from the children.

The Results from School B

One child did not want to read the book because of the preconceived idea that other books are easier to read than the SP. This child, however, still enjoyed the book when it was read by the teacher. The children's favourite animals were the bear, the rhinoceros and the giraffe (especially the latter's markings). This group enjoyed the sing-along the most. The remedial teacher gave all the children an opportunity to play the triangle while the others sang the song. Only a small portion of the children ($n = 5$), however, learnt the essence of the story. All the children enjoyed the book and identified the sound element as the most likeable element.

Table 1: A summary of the children’s responses towards the SP (n = 42).

A (n=21)	School		
14	Illustrations	The child paged through the book because of the:	
13	Book’ s attractiveness	Did the children enjoy the book?	
4	Reading Factor	The child identified the following element as the most likeable:	
21		Did the children understand the essence of the story?	
15	Sound element	Would the children like to page through similar books?	
4	Touch element		
3	Interactive element		
4	Illustration element		
16			
21			

B (n=21)	9	10	3	21	16	3	5	13	5	21
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Teachers' Feedback and Observation

The remedial teacher at School A reported that all the children responded appropriately towards the SP. The children enjoyed the interactive components and in particular the sound and touch elements. The children could easily handle the electronic mechanism.

The teacher from School B reported that the response, except that of one child, was appropriate. The child in question was shy and struggled to express inner feelings. The remedial teacher suggested that the story should rather be divided into several reading sessions and presented to the children over a longer period. She remarked that the SP was more suitable for Grade 3 children. The children, as with the previous school, enjoyed all the interactive components and preferred the sound element more than the other elements. They also enjoyed the animal sounds and especially the giraffe's texture. Some of the children, however, struggled to pull and lift the flaps.

Future Themes for the Read-aloud Book

The study identified twenty topics and requested the teachers to rate these for future suitable story themes. Table 2 provides the data collected from the remedial teachers at School A and School B, as well as a Grade 1 (B1) and a Grade 2 (B2) teacher at School B. The teachers rated these themes on a five-point Likert scale, 1 being the most suitable themes for this age group and 5 being the least suitable. The teachers' ratings are presented in Table 2 below.

Table 2: The teachers' ratings of themes for future read-aloud books.

	Themes	A	B	B1	B2
1	A treasure hunt	1	3	4	
2	A sea holiday	1	4	5	
3	Making new friends	1	1	1	1
4	Then and now	3	4	5	
5	Swimming pool party	2	2	4	1
6	A space adventure	2	4	5	
7	Sport activities and equipment	1	4	2	
8	Making music by using musical instruments	2	1	1	1
9	The natural elements of Mother Earth	2	1	2	1
10	Houses of animals around the world	4	5	3	
11	The early bird catches the worm	3	4	4	
12	Traffic rules and regulations	1	2	1	
13	Healthy food choices for growing little ones	1	1	1	1
14	Animal nationalities	4	5	5	
15	Different transportation methods	1	3	2	
16	Hospitalization	1	2	3	
17	One day as a firefighter	2	3	3	
18	Explore the depths of the sea	2	4	4	
19	A birthday party	1	3	1	1
20	Picnic in the woods	1	2	3	

Discussion of the Results

The two most suitable themes are making new friends (no. 3) and healthy food choices for growing little ones (no. 13). The second most suitable themes are making music (no. 8), the natural elements of Mother Earth (no. 9), traffic rules and regulations (no. 12) and a birthday party (no. 19). The data in Table 2 does not necessarily display suitable themes for all children, but rather serves as an indicator that theme choice differed from school to school as well as from grade to grade. The teacher's personal preference also had an influence on theme selection.

The remedial teacher of School B recommended that the SP was more suitable for children whose first language is English, or alternatively for

Grade 3 children. Both remedial teachers provided recommendations for the improvement of the friendship theme, the flow of the story and the illustrations. The teachers also recommended that the friendship theme should be utilised earlier in the story and repeated several times to indicate the value of friendship and so accentuate the essence of the story. This is possible by using a picture of all of the friends early on in the story, illustrating a scene where the animals help or support each other and by introducing more animal friends that interact with each other. They also suggested the rearrangement of two pages for a better storyline flow. There were difficult words that should have been paraphrased or replaced with other, more suitable, words. These words are “existed”, “jailbreak”, “emigrated” and “exhausted”. Another recommendation was that South Africa should be illustrated on the world map to provide the children with a better orientation of where the different continents are in relation to South Africa.

Conclusion

The objectives of this study were firstly to identify suitable guidelines for the development of a sensory product, secondly to develop a sensory product according to the variables identified from the literature study, thirdly to record the responses of children with learning problems to the sensory products, and to document the remedial teachers’ recommendations.

Teachers at the participating schools recorded and reported the children’s experience with and reaction to the SP. Although the feedback from the teachers were favourable, it was not possible to determine, on a quantitative level, the efficacy of the SP. It was also not possible to discuss the SP with individual children nor to observe them interacting with the SP over a longer period. The ideal would be to observe children interacting with the SP over longer periods, independently of the teachers, conducting in-depth interviews with individual children as well as a larger and more diverse sample.

The results indicated that a sensory product has the potential to assist teachers in their classroom activities. Remedial teachers must, however, evaluate an SP before it is introduced into a classroom or playroom to ensure that it is age and level specific and appropriate for the particular group. The ideal is to incorporate remedial teachers in the developmental phase of the product.

A sensory product may only reach its full potential if it is evaluated for errors and to ensure it is appropriate for the specific target group’s developmental level (Oravec 2000). Children with learning problems

experience learning differently from children without learning problems within a classroom situation (Speece et al. 2003) and SPs may be beneficial in aiding these children, whether it be in a classroom or a playroom situation.

Notes

¹ The term “learning problems” is an umbrella term that for the purpose of this article includes learning restraints, learning disabilities and/or learning disorders.

² Hugo’s grading model: A grading model that assesses and indicates the level of appropriateness of health learning materials. Sociocultural sensitivity and appropriate media and technology use are represented on the X- and Y-axes respectively. By combining the results of the S-shaped curve of all the important factors, a balanced grading can be given to a specific product’s appropriateness and suitability (Botha 2008).

References

- Bambara, L., P. Spiegel-McGill, R. Shores, and J. Fox. 1984. A comparison of reactive and non-reactive toys on severely handicapped children’s manipulative play. *Journal of the Association for persons with severe handicaps*, 9: 142-149.
- Bannatyne, A. 1971. *Language, reading and learning disabilities*. Springfield, ILL: Charles C. Thomas ed., 646. Cited in W. Doyle. 1982. The effectiveness of colour-coded cues in remediating reversals. *Journal of learning disabilities*, 15(4): 227-230.
- Birren, F. 1978. *Colour and human response*. New York: Van Nostrand Reinhold.
- Botha, J. H. 2008. The refinement of a booklet on stroke care at home. PhD Thesis, University of Stellenbosch, South Africa.
- Boyatzis, C. J., and R. Varghese. 1993. Children’s emotional associations with colours. *Journal of genetic psychology*, 155 (1): 77-85.
- Bradley, R., L. C. Danielson, and D. P. Hallahan. 2002. *Identification of learning disabilities: Research to practice*. Washington, DC: Lawrence Erlbaum Associates.
- Centre for Assistive Technology, University of Buffalo (2008). *Let’s play* <http://letsplay.buffalo.edu/> (accessed May 8, 2008).
- Copenhaver, J. F. 2001. Running out of time: Rushed read-alouds in a primary classroom. *Language arts*, 79: 148-158.
- Dales, B. 2007. Pop-up books that make the cut. *Classroom connection–Book links*, 16(6): 29-32.
- Deaver, S. P. 2009. A normative study of children’s drawings: Preliminary research findings. *Art therapy: Journal of the American Art Therapy Association*, 26(1): 4-11.
- Dickinson, D., and M. Smith. 1994. Long-term effects of preschool teachers’ book readings on low-income children’s vocabulary and story understanding. *Reading Research Quarterly*, 29 (2): 105-122.
- Donovan, C. A., L. B. Smolkin, and R. G. Lomax. 1999. Beyond the independent-level text: Readability of first graders’ self-selections. *Reading Psychology*, 21: 309-333.
- Doyle, W. 1982. The effectiveness of colour-coded cues in remediating reversals. *Journal of Learning Disabilities*, 15(4): 227-230.
- Englert, C. S., K. L. Tarrant, T. V. Mariage, and T. Oser. 1994. Lesson talk as the work of reading groups: The effectiveness of two interventions. *Journal of Learning Disabilities*, 27 (3): 165-185.
- Grasso, M. C., D. J. Allison, B. M. Button, and S. M. Sawyer. 1999. Music and physiotherapy: Evaluation of a program developed for caregivers of infants and toddlers with Cystic Fibrosis. In: R.R. Pratt and D.E. Grocke, eds., *Music Medicine and Music Therapy expanding horizons* (201-211). Melbourne: University of Melbourne.
- Hammil, D.D., and N. R. Bartel, eds. 1978. Teaching children with learning and behaviour problems. Boston: Allyn and Bacon Inc. Cited in: Doyle, W. 1982. The effectiveness of colour-coded cues in remediating reversals. *Journal of Learning Disabilities*, 15(4): 227-230.
- Hsieh, H. 2008. Effects of ordinary and adaptive toys on pre-school children with disabilities. *Research in Developmental Disabilities*, 29 (5): 459-466.
- Hubley, J. 1994. *Communicating Health*. London: MacMillan.
- Hugo, J. 2002. Designing trigger pictures in context: The challenge of balance. *Journal of Audiovisual Media in Medicine*, 25 (3): 99-105.
- Johnson, M., and W. Smolen. 1995. The best toys of 1995. *Parents*: 133-144.
- Kemper, K. J. and S. C. Danhauer. 2005. Music as therapy. *Southern Medical Journal*, 98 (3): 282-288.
- Kennelly, J., and K. Brien-Elliott. 2001. The role of music therapy in paediatric rehabilitation. *Paediatric Rehabilitation*, 4 (3): 137-143.
- Kurkjian, C., N. Livingston, K. Henkes, R. Sabuda, and L. Yee. 2005. Children’s books evocative books: Books that inspire personal response and engagement. *The Reading Teacher*, 58(5): 480-488.
- Luckin, R., L. Connolly, L. Plowman, and S. Airey. 2003. Children’s interactions with interactive toy technology. *Journal of Computer-assisted Learning*, 19: 165-176.
- Mariage, T. V. 1995. Why students learn: The nature of teacher talk during reading. *Learning Disability Quarterly*, 18 (3), 214-234.

- Mastropieri, M. A., and T. E. Scruggs. 1989. Constructing more meaningful relationships. Mnemonic instruction for special population. *Educational Psychology Review*, 1(2): 83-111. Cited in M. A. Mastropieri, and T. E. Scruggs. 1997. Best practices in promoting reading comprehension in students with Learning Disabilities. *Remedial and Special Education*, 18(4).
- Mastropieri, M. A., T. E. Scruggs, J. P. Bakken, and C. Whedon. 1996. Reading comprehension: A synthesis of research in learning disabilities. In T. E. Scruggs and M. A. Mastropieri, eds. *Advances in Learning and Behavioural Disabilities* (Vol. 10, Part B, 201-227). Greenwich, CT: JAI Press: 201-227.
- Mastropieri, M. A., T. E. Scruggs, and B. J. M. Fulk. 1990. Teaching abstract vocabulary with the keyword method: Effects on recall and comprehension. *Journal of Learning Disabilities*, 23(2): 92-96.
- Mastropieri, M. A., J. Sweda, and T. E. Scruggs. 2000. Putting mnemonic strategies to work in an inclusive classroom. *Learning Disabilities Research and Practice*, 15(2): 69-74.
- McNamara, J. K. 2004. Supporting children with Learning Disabilities. *Brock Education*, 14(1): 72-84.
- Mencap. 2007 Making myself clear.
http://ucdmc.ucdavis.edu/cne/health_education/guide.html, (accessed August 28, 2007).
- Miller, S. A., and E. B. Church. 2003. How children build skills through art. *Early Childhood Today*, 17 (7): 26.
- Morris, C. 2001. *Getting the write message right: A review of guidelines for producing and evaluating print agricultural information materials*. Agricultural Research Council, Range and Gorge Institute Pietermaritzburg. Information Studies, University of Natal.
- O'Neill, D. K., and S. C. F. and Chong. 2001. Preschool children's difficulty understanding the types of information obtained through the five senses. *Child Development*, 72(3): 803-815.
- Oravec, J. 2000. Interactive toys and children's education: Strategies for educators and parents. *Childhood Education*, 77 (2): 81-85.
- Petterson, R. 2002. *Information design: An introduction*. Netherlands: John Benjamins Publishing Company.
- Pitchford, N. J. 2006. Reflections on how colour term acquisition is constrained. *Journal of Experimental Child Psychology*, 94: 328-333.
- Pitchford, N. J., and K. T. Mullen. 2001. Conceptualization of perceptual attributes: A special case for colour. *Journal of Experimental Child Psychology*, 80: 289-314.
- Sabbotsky, E. 1997. Understanding the distinction between sensations and physical properties of objects by children and adults. *International Journal of Behavioral Development*, 20 (2): 321-347.
- Schiffman, C. B. 1995. Visual dialect: Ethnovisual and sociovisual elements of design in public service communication. In: D. G. Beauchamp, ed. *Image and visual literacy. International Visual Literacy Association* 273-280.
- Schoeman, J. P., and M. van der Merwe. 1996. *Entering the child's world: A play therapy approach*. Harmondsworth: Penguin.
- SchwabLearning.org 2007. Making the most of standard technology to enhance learning
http://www.schwablearning.org/print_resources.asp?type=article&r (accessed April 12, 2007).
- Scruggs, T. E., and M. A. Mastropieri. 1989. Reconstructive elaborations: A model for content area learning. *American Educational Research Journal*, 26(2): 311-327.
- . 1992. Classroom applications of mnemonic instruction: Acquisition, maintenance and generalisation. *Exceptional Children*, 58: 219-229.
- Sharpe, D. T. 1974. *The psychology of colour and design*. Chicago: Nelson-Hall.
- Sipe, L. R. 2000. "Those two gingerbread boys could be brothers": How children use intertextual connections during storybook read-alouds. *Children's Literature in Education*, 31(2): 73-90.
- Speece, D. L., L. P. Case, and D. E. Molloy. 2003. Responsiveness to general education instruction as the first gate to learning disabilities identification. *Learning Disabilities Research and Practice*, 18 (3): 147-156.
- Swanson, J. M., A. Barlow, and M. Kinsbourne. 1979. Task specificity of responses to stimulant drugs in laboratory tests. *International Journal of Mental Health*, 8, 67-82.
- Tanner, D. R. 2001. Music and the special learner. *Education*, 101(1): 46-49.
- Taylor, S. I., G. Morris, and C. Rogers. 1997. Toy safety and selection. *Early Childhood Education Journal*, 24 (4): 235-323.
- Weinberger, N., and E. W. Bushnell. 1994. Young children's knowledge about their senses: Perceptions and misconceptions. *Child Study Journal*, 24(3), 209-223.
- White, M. 1998. "The pink's run out!" The place of artmaking in young children's construction of the gendered self. In: N. Yelland, ed. *Gender in the early childhood years* (Chapter 12). London: Routledge.
- Winston, A. S., B. Kenyon, J. Stewardson, and T. Lepine. 1995. Children's sensitivity to expression of emotion in drawings. *Visual Arts Research*, 21: 1-14. In: N. C. Gardner and C. Thompson, 1995. *Visual Arts Research*.
- Zentall, S. S., T. R. Zentall, and M. E. Booth. 1978. Within-task stimulation: Effects on activity and spelling performance in hyperactive and normal children. *Journal of Educational Research*, 71, 223-230.
- Zentner, M. R. 2001. Preferences for colours and colour-emotion combinations in early childhood. *Developmental Science*, 4, 389-393.

Zimmer, A., and F. Zimmer. 1978. *Visual literacy in communication: Designing for development*. Hulton Educational Publications: Amersham.