THE DEVELOPMENT AND IMPLEMENTATION OF A QUALITATIVE TOOL INTO A SENSORY PRODUCT WHICH CAN BE USED IN A CLASS SITUATION FOR CHILDREN WITH LEARNING PROBLEMS

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Abstract

Children with Learning Problems (LP) differ from other children and are mostly identified in the primary grades. Factors which may influence the development of sensory products to stimulate children with LP are design factors such as illustrations, colour, themes and supporting factors which include therapeutic practices and cultural sensitivity. The previous mentioned factors may be beneficial for text enhancement and reading comprehension within books for children with Learning Disabilities (LD). It is envisaged that if design factors as well as sensory stimulants are integrated into play therapy mediums such as the Sensory Product (SP), it will be able to stimulate a child with LP through different therapeutic practices. Special needs teachers aid children with LP through intervention strategies once they are identified. Intervention strategies involve the use of instruments such as scripted and prescribed programmes (Fuchs & Fuchs, 2006), reading aloud by teachers to children (Fisher, Flood, Lapp & Frey, 2004) and one-on-one instruction as part of the three-tiered Reading to Intervention Model (RIM) (Scanlon & Sweeney, 2008). SP have the potential to assist teachers and children with LP but only if those products are appropriate for the children's developmental level (Oravec, 2000).

Keywords: Checklist, Children with Learning Problems, Qualitative Tool, Sensory Product, Cornerstones.

1. INTRODUCTION

A latent disability or disabilities are most likely to be identified once a child enters primary school level. Children entering primary school and who are identified as having learning problems are at a crucial age as far as the effectiveness of interventionist measures is concerned. Early intervention is thus of utmost importance in most if not in all cases of children with LP to ensure that they receive the maximum benefit from the treatment and measures employed.

2. OBJECTIVES

The objectives of the study are:

- To obtain suitable guidelines from the literature review on the development of sensory products.
- The compilation of a checklist from the guidelines of the literature review that can be used to asses an SP for children in the classroom as well as within a therapeutic practice.
- To record the responses of the children towards the SP as well as the recommendations by the teachers.

3. HYPOTHESES

The first hypothesis of this study will be the compilation of a checklist, from the guidelines of the literature review, for the assessment of an SP. The second hypothesis will be the implementation of the above mentioned checklist into an SP that will be used for the methodology phase.

4. METHODOLOGY PHASE

Description of tools for data collection

A remedial teacher and an occupational therapist were consulted for the compilation of the questionnaire that was used for the data collection. They identified all relevant questions that were suitable for the age group concerned. The primary aim of this tool is to document children's interaction and experience with the SP so that possible problems can be identified in this regard. Please see Table 1 for the questionnaire that was used in this study.

Table 1. Questionnaire to document children's responses towards the SP

Section A - The Child's Interaction with the Sensory Product
1. Why did you page through the storybook? (If the child picked up the storybook of his own accord and started paging through it.)
2. What made you look at the storybook before paging through it?
3. Did you enjoy the storybook?
4. What did you like most about the storybook?
5. Why? (If the child does not know, the teacher can point out the different characteristics and sections of the book, namely colour, music, hand-eye coordination, puzzles and pop-up.)
6. What did you learn from the storybook?
7. How will you use what you have learned from the storybook?
8. Would you like to page through similar storybooks?

Section B - The Teacher's Feedback from the Interaction that took place between the Children and the Sensory Product:

1. Was the child's reaction to the storybook typical and/or expected?
2. If not, why?
3. Did the child understand the content of the storybook?
4. If not, was the storybook to abstract for the specific age group that the child belongs to?
5. Did the child enjoy the storybook?
6. How did the child's enjoyment of the book manifest itself? (Example: Did he or she laugh? Did he or she want to page through similar storybooks, etc?)
7. Did children with different disabilities/disorders react differently to the storybook?
8. In which way?
9. Which section of the storybook did the child enjoy the most? (Example: Colour, music, hand-eye coordination, puzzle or pop-up.)
10. Why? (Example: It was entertaining, interesting, or easy to use.)
11. Was the child able to page through the booklet on his or her own, i.e. was it easy to handle?
12. Did the child want to look at the storybook out of his own: Was it eye-catching?

Section C - The Teacher's Observation in regard to the Children's interaction with the Sensory Product

The teacher is required to conduct an observation analysis in regard to the children's interaction with the SP. Any unique interaction and/or recommendations can be mentioned.

The expansion of the SP requires the identification of suitable story themes (please see Table 3 for the questionnaire that was used). The aim of this tool is the identification of the most suitable story themes for children in Grade 1 and 2 for the expansion of the SP. The twenty themes were recommended as top early elementary themes by Reading is Fundamental (2009).

Permission to conduct research

An application to conduct research had been sent to the Department of Education, Free State. Permission was granted to conduct research at schools under conditions that were specified by the Department of Education, Free State, South Africa.

Selection Process

Selection process of Schools. Forty-five primary schools were identified within the city of Bloemfontein, Free State, South Africa (these exclude higher primary schools and Bochabela schools). Primary schools which are situated within or nearby the central business district of the city were selected for the sake of convenience. Primary schools were further selected on the criteria of number of pupils, school fees, and their children had to be representative of the South African population. Letters of permission to conduct research were sent out to the selected schools' principals. Permission was obtained from only two schools.

Selection process of Children. Children were recruited from two schools in Bloemfontein, Free State, South Africa by the remedial teachers of the different schools. A total of forty-two children in Grade 1 and 2 were selected for participation in the SP testing. Twenty-four male and eighteen female children were selected. All children received their schooling in the English language. It must be noted that all the children were children whose second language was English. The children were identified by the schools' remedial teachers and were children with LP. Letters of permission for the participation of the children were sent out to the parents of the children.

Method

The three selected children were put in a classroom. School A had the resources of three remedial teachers to its disposal. One was the primary story teller while the other two acted as observers. These two teachers sat at the back of the class observing the interaction of the children with the SP. The SP was placed on a low table for the children to see and they could page through it if they so desired. All three children sat around the table so that the proximity of the children was in close relation to the teacher. The remedial teacher who was the primary story teller handled the SP throughout all of the sessions. The interactive prompts were read by the story teller and the children were included in the different activities. These consisted of pushing the buttons to activate the sound element, singing along to the song, playing the triangle, pulling the flaps and feeling the different textures. After the interaction with the SP, each child was interviewed by one of the three remedial teachers directly after the session. The teachers noted their responses to the questions of the associated questionnaire and recorded each child's response towards the SP.

School B had only one remedial teacher available to assist with the testing. Three children were used in each session. After the interaction with the SP, only one of the three children was interviewed directly afterwards. The other two were also interviewed individually, but twenty minutes or more after each other.

Cornerstone 1: Design Factors

The first cornerstone consists of two elements, namely the design element and the book element. Each of these elements has several sub-categories that provide specific information that will contribute to the development of sensory products.

The Design Element

This section of work relates to illustrations, language, colour and layout, typography and visual appearance which will contribute to design as an element within this article.

Research identified three categories of illustrations which may be beneficial for children with LD, namely: (1) representational illustrations and imagery; (2) mnemonic illustrations and (3) adjunct aids (Mastropieri, Scruggs, Bakken, & Whedon, 1996). Representational pictures and imagery have a supporting effect on reading comprehension according to Levi and Paivio (as cited in Mastropieri & Scruggs, 1997) and must be more explanatory to represent the text as it provides a "sensory code" for input of text information. Mnemonic illustrations is intended to facilitate memory of key vocabulary or important content information from text materials (Mastropieri et al., 1996). It transforms textual information by using visual and verbal cues and thereby creating a linking association (The Access Center, 2007) as well as promotes the reading comprehension of children (Mastropieri & Scruggs, 1997). Mastropieri and Scruggs' (1997) study indicated that adjunct aids such as study guides, highlighting, underlining, embedded questions and semantic feature analysis charts produce positive effects among students with LD as well as promote reading comprehension. Botha (2008) evaluated several existing checklists by using Hugo's grading model. Several key elements regarding language were identified and can be used within the development of the SP as an evaluation tool for language. Another important aspect that must be kept in mind is that the language within the SP should be consistent right through the text as this reduces the chances for confusion and misunderstanding that might occur (Capital Health Patient Education Advisory Committee, 2004; Mencape, 2002).

Colour is capable of enhancing communication by adding clarity and impact to a message. Colour can be effectively used for the identification of the main points within a document (Carstens, 2004; Snyman, 2004) and is of vital importance when it carries information that is essential to the contents of a visual (Petterson, 2002). Carstens (2004) as well as Morris (2001) recommended that the selected colour scheme be pre-tested on the specific target group.

A colour-coding process may enable learners to retain critical information and disregard redundant and irrelevant information.

An effective and systematic colour code with a maximum of four to six colours in a learning material assists the learner in organizing and categorizing stimuli into meaningful patterns (Petterson, 2002). The colour- coding technique can be used in the remediation of children with reversal problems (p, b and d), problem letters, phonemes, vowels and/or words (Mastropieri & Scruggs, 1997). One function of colour is carrying gender-related information (Boyatzis & Varghese, 1993). The adage "pink is for girls and blue is for boys" is reflected in parents' use of these colours to distinguish between sons' and daughters' early environments and objects (Pomerlau, Boluc, Malcuit, & Cossette, 1990). Burkitt, Barrett and Davis' (2003) as well as Zentner's (2001) studies indicated, once again, the association between colour and emotional symbolism.

Other design factors that must be considered for the development of sensory products are layout, typography, and the visual appearance of the content of the SP (Botha, 2008). The cover design, effective use of white space and margins, variation in line length and text justification are part of the necessary elements of layout that attract and capture a reader's attention (Morris, 2001). Botha's (2008) study identified several key elements regarding layout, typography, and visual appearance that can be used as an evaluation tool for existing checklists. The literature is divided in its view on the use of serif or san serif fonts (Gasser, Boeke, Hafferman, & Tan, 2005; Mencap, 2002; NHS, 2006; The University of Reading Department of Typography and Graphic Communication, online); however, it is of more value that several authors agree on the importance of a typeface weight and size (Hartley, 1994; Radmeyer, online; Snyman, 2004). The most important aspect of a typeface is that it must be clear and easy to read for the specific target group. Lexia is a free sans serif font that includes a non-symmetrical b and d (i.e. the b does not look like a backwards d) and handwritten forms of the letters a and g, which readers may recognize more easily and which is recommended for children with LP (SchwabLearning.org, 2007).

Text is an important element of layout that needs consideration especially when designing sensory products for children. Rowntree (1966) developed a set of guidelines several years ago for writing effective text. Several of these guidelines, however, for example the use of the first person and direct address (i.e. the author talks directly to the reader), are in direct contrast with the Radical Change characteristics identified by Dresang (1999) and which is a more recent set of guidelines. Petterson (2002) also developed several guidelines regarding the element of text and these were incorporated into the proposed checklist.

The Book Element

This section of work consists of types of books, book themes and guidelines for children's books which will contribute to the different kinds of children's books as an element within this article.

Topic choices for children's books are mostly indicated by the gender of the child (Donovan, Smolkin, & Lomax, 1999). Donovan et al. (1999) noted in their study on the Self-Selection Criteria of First-Graders that reading groups consisted of children belonging to the same sex and who would select multiple books on a single topic. The different types of children's books can be classified as belonging to one of the following sub-categories, namely storybooks and interactive and read-aloud books. Most storybooks are designed for young children and are promoted by the primary classroom (Duke, 2000; Pappas, 1991; Smolkin & Donovan, 2003). Storybooks may include a repeating line or repeating lines which children recognize (Center for Assistive Technology, 2000) and which on its part lead to reader anticipation.

Read-aloud books may support children's developing ability to reason for themselves as well as their ability to reason with others; discussions of a book being read may likewise develop children's reasoning abilities (Dickson & Smith, 1994). The type of scaffolding, modelling, reading strategies, supported risk-taking and the sharing of control by teachers regarding interactive and read-aloud books has been found to produce greater gains in work with learners in special education (Englert, Tarrant, Mariage, & Oxer, 1994; Mariage, 1995). The different book themes consist of the sub-categories music book, texture book, Hand-eye Coordination/Perceptual-motor Coordination book, puzzle book and pop-up book.

Sound and/or music can be incorporated into a children's book through (1) a CD that contains a reading of the story and is played to the "reader" or (2) a reactive book in or on which buttons can be pressed by the reader to play a specific melody and/or sound. Several studies concluded that music can be useful as a therapeutic medium (Kemper & Danhauer, 2005; Kennelly & Brien-Elliot, 2001). Songs, rhymes, chants, musical games and lullabies have been used for many years to teach very young children social, language, motor and emotional skills that are required for functioning within a family as well as in their wider environments (Grasso, Allison, Button, & Sawyer, 1999). Tactile stimulation or texture can be incorporated into children's books through (1) pieces of textured material and/or paper rotating wheels, doors, flaps and cut-outs within the book and (2) a book that is completely made out of a textured material and/or paper.

Preschoolers can develop their creative problem-solving skills and increase hand-eye coordination through the use of materials. Tactile materials hold a special appeal for curious preschoolers that are ready for new adventures (Miller & Church, 2003). Children's books can develop hand-eye coordination through the use of different materials such as (1) textured materials, (2) wooden blocks and (3) the movement of solid objects; perceptual-motor coordination exercises can be incorporated through the use of (1) rhythmic instruments such as rhythm sticks and triangle cutting, (2) colouring, (3) writing and (4) the threading of beads.

According to Taylor, Morris and Rogers (1997), puzzles form part of a group of few toys that are especially appropriate for young, school-age children. Puzzles provide visual discrimination practice as a child can figure out how the different elements fit together to form the visual whole. Puzzles also provide practice in eye-hand control as the pieces are fitted together (Stephenson, 2000).

A child's natural curiosity and wonder are clearly evident as he or she interacts with pop-up books that feature sophisticated paper engineering design and are often like works of art. According to Ball (2003), these books are also great enticement for reluctant readers. Pop-ups books consist of movable, three-dimensional illustrations, rotating wheels, doors, flaps and cut-outs. The formats of these books require hands-on interaction and involvement which can add extent to and develop the theme of the book and can also encourage reading with expression, enthusiasm and physical movement (Kurkjian, Livingston, Henkes, Sabuda, & Yee, 2005).

Dresang (1999: 14) believed that contemporary children's and young adult's literature "is a changing step with positive changes in the digital world". Dresang's Radical Change framework identified three types of fundamental change in contemporary literature for children and youth, namely: changing forms and formats, changing perspectives and changing boundaries.

Words and pictures are reaching new levels of synergy (Pantaleo, 2004). Several individuals have developed categories to describe the various text and image interactions in children's books (Nikolajeva & Scott, 2001). In many contemporary children's books, the synergism between text and illustrations are becoming more sophisticated as a result of the implementing of non-linear and consequential organization, multiple layers of meaning and interactive formats (Pantaleo, 2004). Picture books with Radical Change characteristics provide opportunities for readers to develop their abilities in comprehending text inferentially and critically. In addition to providing pleasurable aesthetic reading experiences, these types of books can teach critical thinking skills, visual-literacy skills and interpretive strategies (Pantaleo, 2004).

Cornerstone 2: Supporting Factors

The following section bears reference to the toy element, play and play therapy, and cultural sensitivity and socio-economy.

The Toy Element

Interactive toys have many aspects that can confuse, frustrate or mislead children if the toys are not appropriate for a child's developmental level. Some of these aspects include: (1) poor quality of feedback to children; (2) negative effects upon children's imagination; (3) problems in children's socialization and (4) children's concerns about whether the toys are "alive" (Oravec, 2000).

Several sets of guidelines were identified by the literature that must be taken into consideration in regard to toys and their developmental appropriateness for young school-age children (Johnson & Smolen, 1995), selection of toys and play materials in regard to children with special needs (Bailey & Wolery, 1992) and the Consumer Product Safety Commission's (1997) set of standards. All these guidelines were incorporated into the proposed checklist.

In a study of children's interactions with interactive toy technology it was reported that this type of technology has potential (Luckin, Connolly, Plowman & Airey, 2003). The shortcomings of Luckin et al.'s (2003) interactive toys were that the toys themselves were not suitable learning aids as the children's responses to the toys were inadequate and in some cases even inappropriate. In a related study the need for developing interactive toys was highlighted as children with developmental disabilities respond better to these types of toys during play sessions (Hsieh, 2008; Bambara, Spiegel-McGill, Shores & Fox, 1984).

The Play and Play Therapy Element

Play has become an integral part of school curricula as a result of increasing attention (Saracho & Spodek, 2003; Swianarsky, Breitborde, & Murphy, 1999) and is gradually being integrated into educational efforts in many nations. Children's play has been associated with a variety of important developmental and educational outcomes which include: (1) problem-solving, (2) planning, (3) conflict and negotiation, (4) personal and social boundaries, (5) release of tension, (6) frustration and (7) aggression (Johnson, Christie, & Yawkey, 1999).

The Cultural Sensitivity and Socio-Economic Element

Hugo (2002) highlighted the importance of socio-economic and cultural sensitivity within his study by relying on historical data gathered from a picture card game on child accident prevention for school pupils in South Africa in 1994. This study revealed that 80% of learners who live within a squatter community have never been exposed to picture books (Hugo, 1994). One of the most important implications was their limited visual literacy skills which influences their accessibility to information and academic progress. A set of guidelines for cultural sensitive graphic design elements was identified in Hugo's (2002) study and was incorporated into the proposed checklist.

Sensory Products and Remediation Element

Remediation steps may even include regular feedback from teachers, the use of diagrams, graphics and pictures to provide a key to the meanings of words, modelled instructional practices and engaging children in open-ended questions (Learning Disabilities Association of America [LDA], 2009). Toys that remedial teachers can use in their classrooms may consist of books with tactile properties, puzzles, musical instruments, sing-along and interactive games.

Tactile toys are referred to as sensory products (SP) which are defined by a combination of the different sensory actions. These sensory actions include seeing, hearing, smelling, touching and tasting. Qualities that define SP are that they include properties such as interactivity and sensory actions.

Factors which may influence the development of SP to stimulate children with LP are design factors such as illustrations, colour and themes and supporting factors which include therapeutic practices and cultural sensitivity. The effective use of these factors may be beneficial for text enhancement and reading comprehension within books for children with Intellectual Disabilities (ID).

Data analysis and Discussion

Child's Interaction with the SP
The results of the children' interaction and experience are presented in Table 2.

Table 2. Summary of children's responses towards the SP

	Question 1 The child paged through the book because:			Question 2 Did the children enjoythe book as a whole	Question 3 The child identified the following element as the most likeable:				Question 4 Did the children understand the essence of the story?	Question 5 Would the children like to page through similar books?
Schools	Illustrations	Aesthetical attractiveness	Reading Factor		Sound element	Touch element	Interactive element	Illustration element		
A	14	13	4	21	15	4	3	4	16	21
B	9	10	3	21	16	3	5	13	5	21

Analysis of the Results

School A. Children were selected from Grade 1 and 2 remedial classes. Only one child did not want to page through the SP. The colourful illustrations caught several of the children' attention and different kinds of animals were identified as their favourites. This group of children enjoyed the sing along and the animal sounds the most. Most of the children understood the essence of the story (n = 16).

One child did not answer the question on which element was the most likable whereas other children provided one or more answers. The children enjoyed the book as a whole and the sound element was identified as the most likeable element. The reading factor received the least attention from the children.

School B. The selected children were from only Grade 2 remedial classes only. One child did not want to read the book because other books are easier to read than the SP presented to the group. 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 its spots. This group of children by far enjoyed the sing-along 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 did learn the essence of the story ($n = 5$). All the children enjoyed the book as a whole and identified the sound element as the most likable element.

Teacher's Feedback and Observation from the Interaction that took place between the Children and the SP

The questions in this section were aimed to document the children's interaction with the SP as the teacher experienced it.

School A. The remedial teacher documented that all the children's responses towards the SP were seen as suitable behaviour. The children found the SP to be interesting and enjoyed the interactive components. The components which were the most favourable were the sound and touch elements. These elements enabled the children to sing along to the songs and they could also experience different textures. The design of the electronic mechanism was documented as being easy to handle for a child and it is thus concluded that the design was successful. Children with different disabilities and/or disorders reacted differently to the SP.

School B. The remedial teacher completed questionnaires for each of the days in which the methodology phase was running at the school. The teacher documented that except for one child all the children's responses towards the SP were seen as suitable behaviour. The reason provided for this was that the child is shy and struggles to express inner feelings. The remedial teacher suggests that the story should rather be divided into several reading sessions for the children to be exposed over a longer period to the SP or otherwise that it is more suitable for Grade 3 children. The children found the SP to be interesting and enjoyed all the interactive components. The component identified as the most favourable was the sound element. The playing of the triangle amused the children and they enjoyed singing along to the song. Other elements that the children were fond of the animal sounds and especially the texture of the giraffe. The book's interactive components were documented as easy to page through but some of the children struggled to pull and lift the flaps.

Children with different disabilities and/or disorders reacted differently to the SP.

The Theme Questionnaire that the Teachers used to Identify Suitable Story Themes for Grade 1 and 2 Children

The expansion of the SP requires the identification of suitable story themes. Twenty suitable story themes were identified and compiled within a questionnaire for teachers. Table 3 catalogues the data collected from the two remedial teachers at the different schools, namely A and B, and a Grade 1 and a Grade 2 teacher at School B. The teachers had to use a scale of 1 to 5 with 1 being the most suitable themes for this age group and 5 the least suitable.

Table 3: Questionnaire for the identification of suitable story themes.

	Themes	A	B	B1	B2
1	A treasure hunt (going on a treasure hunt to find the hidden treasure)	1	3	4	
2	A sea holiday (sand, shells, sun and sandcastles)	1	4	5	
3	Making new friends (first day at a new school)	1	1	1	1
4	Then and now (Mammoth vs Elephant)	3	4	5	
5	Swimming pool party (games, tubes and water safety)	2	2	4	1
6	A space adventure (our galaxy and planets)	2	4	5	
7	Sport activities and equipment (cricket is played with a bat and ball)	1	4	2	
8	Making music by using musical instruments (singalongs)	2	1	1	1
9	The natural elements of mother earth (wind, rain, sun, trees, water)	2	1	2	1
10	Houses of animals around the world (Igloo = Polar bear)	4	5	3	
11	The early bird catches the worm (hard work reaps rewards)	3	4	4	
12	Traffic rules and regulations (sign boards, traffic lights and police officers)	1	2	1	
13	Healthy food choices for growing little ones (fruit and vegetables)	1	1	1	1
14	Animal nationalities (China = Giant Panda; Africa = Lion)	4	5	5	
15	Different transportation methods (trains, planes, cars and boats)	1	3	2	
16	Hospitalisation (ride in an ambulance, emergency services, nurses)	1	2	3	
17	One day as a firefighter (activities of a firefighter)	2	3	3	
18	Explore the depths of the sea (different kinds of fish)	2	4	4	
19	A birthday party (invitations, baking the cake, hosting a party)	1	3	1	1
20	Picnic in the woods (do not pollute the environment)	1	2	3	

From the above data it can be determined that the two most suitable themes are making new friends (nr. 3) and healthy food choices for growing little ones (nr. 13). The second most suitable themes are making music by using musical instruments (nr. 8), the natural elements of mother earth (nr. 9), traffic rules and regulations (nr. 12) and a birthday party (nr. 19). The data in Table 3 does not necessarily display suitable themes for all children, but rather serves as an indicator that theme choice differ from school to school as well as from grade to grade. It must also be taken into consideration that the teacher's preference towards certain themes also had an influence of theme selection.

Several contradicting conclusions by different authors were found in this literature review. From as early as the 1970's, several authors concluded that representational pictures and imagery have a supporting effect on reading comprehension (Levi & Pavio as cited in Mastropieri & Scruggs, 1997). In a more recent study by Mastropieri and Scruggs (1997), research on the use of representational pictures and imagery instruction indicated, in contrast, vague results whereas all other strategies (mnemonic illustrations, spatial organization, study guides, and semantic feature analysis charts) evoked a positive effect on students with LD.

Several methods of colour-coding has been identified, namely colour-coding the problem letters (p, b and d), the vowels, phonics and phonemes. Colour can be used in the remediation of learners with reversal problems, but some systems differ in their use of this technique, notably that of Bannatyne (1971: 646) where only colour-coded vowels were used whereas others lean more towards a phonics approach and colour-coded phonemes, such as the Psycholinguistic Colour System (PCS) (Hammil & Bartel 1978: 82). Doyle (as cited in Mastropieri & Scruggs, 1997), on the other hand, explored the effectiveness of the colour-coding technique in the remediation of the reversals of p, b and d for children with reversal problems. A conclusion that was drawn by Doyle (as cited in Mastropieri & Scruggs,1997) is that the colour-coding technique must be used in association with the WISC to obtain optimum results.

In the previous decades schooling was dominated by teachers who spent their time evaluating responses of children and dominating the instructional conversation. This type of scaffolding, modeling, reading strategies, supported risk-taking and the sharing of control by teachers regarding interactive and read-aloud books has been found to produce greater gains in work with learners in special education (Englert et al., 1994; Mariage, 1995).

The research conducted by Hsieh, (2008) as well as Bambara et al. (1984) highlighted the benefits and value of SP for children with developmental disabilities, but the shortcomings of Luckin et al.'s (2003) study must be taken into consideration because these products must be appropriate for the child's developmental level (Oravec, 2000).

The questions that were identified by the above discussion are how to develop more effective SP, how to rate such a product and how to determine the quality of a SP. One way by which teachers can evaluate SP is to make use of a checklist.

5. CONCLUSION

The objectives of this paper were: (1) to obtain suitable guidelines from the literature review on the development of sensory products, (2) the compilation of a checklist from the guidelines of the literature review that can be used to asses an SP for children in the classroom as well as within a therapeutic practice and (3) to record the responses of the children towards the SP including the recommendations by the teachers. The data for the responses and recommendations were collected by means of four questionnaires. The hypotheses of this study were the compilation of a checklist, from the guidelines of the literature review, for the assessment of an SP the implementation for the methodology phase. A checklist of suitable design guidelines was composed as a research output (see Table 4). An SP, with the implementation of these guidelines, can possibly stimulate a child with LP if it is integrated into various therapeutic practices. Products developed in accordance with SP guidelines can be used in play therapy, occupational therapy, remediation or any classroom situation.

Checklists are used to evaluate various materials, matters and qualities, from information design (Petterson, 2002), media appropriateness and cultural sensitivity (Hugo, 2000) to the refinement of a book on stroke care at home (Botha, 2008). Such a checklist must include the factors which play a contributing role towards the development of such a product such as design factors, therapeutic practices and cultural sensitivity. A SP was evaluated using a checklist which was previously developed according to a literature review by the authors. The SP was redesigned according to the checklist, resulting in the SP which was tested with the children.

The remedial teacher of School B recommended that the SP is more suitable for English first language children or alternatively Grade 3 children. Both remedial teachers provided recommendations for the improvement of the friendship theme, the flow of the story and the illustrations which were subsequently implemented into the SP for the final product development. The most important recommendation that was made was that the SP is more suitable for Grade 3 children or English first language Grade 2 children. The data analysis of suitable themes suggested two themes that were most suitable for children in Grade 1 and Grade 2. Several contradicting theme choices were made in the questionnaires by the teachers. This only indicates that theme selection differs from school to school as well as from grade to grade. It must also be taken into consideration that the teacher's preference towards certain themes also has an influence on theme selection.

For future research the recommendation can be made that the SP must firstly be evaluated by remedial teachers to ensure that an SP adheres to all the criteria.

Table 4: A checklist of suitable guidelines from the literature for the assessment of an SP.

Cornerstone 1: Design Factors	
The design element - Illustrations	
1.	Illustrations must represent the accompanying text
2.	Illustrations must be mnemonic in nature and use one of the following strategies:
2.1	Keyword strategy
2.2	Peg word strategy
2.3	Letter strategies
3.	Adjunct aids must be incorporated as a support medium
4.	Illustrations must adhere to the criteria of Botha (2008):
4.1	Illustrations must be realistic
4.2	Illustrations must agree with the content of the text
4.3	Illustrations must have captions
4.4	Illustrations must be suitable for the specific target group
4.5	Illustrations must have legends that are explanatory, instructive and understandable
4.6	Text must provide information regarding the illustrations
4.7	Graphic cues (arrows and lines) must be used to direct attention to a specific item
4.8	Text may not flow over the illustrations
5	Illustrations must adhere to the criteria of Hugo (2002):
5.1	Learner variables' must be appropriate
5.2	Picture-coding variables' must be appropriate
5.3	Socio-cultural variables must be appropriate
The design element - Language	
1.	The English language must be used to identify colour terms
2.	Language must adhere to the criteria of Botha (2008). Language must use:
2.1	Short words
2.2	Short sentences
2.3	Short paragraphs
2.4	Third person

2.5	Active voice
2.6	General, everyday words
2.7	Simple grammatical structures and punctuation
2.8	Numbers rather than words
2.9	Language must be consistent throughout
The design element - Colour	
1.	The eleven universal colour categories must be used to identify colour terms
2.	Only these colour categories may be used
3.	Colour must be used for illustrations/contents that convey vital information
4.	Colour can carry gender-related information by means of a theme
5.	A colour emotion association task must be incorporated to establish whether a storyline is positive or negative
6.	Colour scheme must be pre-tested with target group
7.	Colour coding technique must be incorporated for reversal problems and can include the following techniques:
7.1	PCS
7.2	WISC
7.3	SCWT
8.	Aspects of colour that must be considered within the printing process:
8.1	Colour of the paper
8.2	Colour of the typography
8.3	Contrast between paper and typography
8.4	Yellow typography, dark or bright background or reverse typography (white out of a colour) must be avoided
The design element – Typography, layout and visual appearance	
1.	Typeface must include a non-symmetrical b and d
2.	Typeface must include handwritten forms of a and g
3.	Only two different typefaces may be used
4.	A bold typeface must be used to highlight specific words or phrases

5.	Typography, layout and visual appearance must adhere to the criteria of Botha (2008). The following criteria must be used:
5.1	A 12 points font
5.2	A clear typeface
5.3	Sentence case
5.4	Sufficient white space
5.5	Left alignment
5.6	Layout must be consistent
5.7	Headings must be clear, consistent and close to the related text
5.8	The cover must be attractive, indicate the core content as well as the intended audience
The book element – Types of books	
1.	The storyline must be pre-tested with the target group
2.	Interactive and read-aloud approach must be used
3.	Informational text must be incorporated for boys and struggling readers
4.	Repetitive line/s can be incorporated for reader anticipation
5.	Text enhancement and reading comprehension elements can be incorporated
The book element - Themes of books	
1.	Songs, rhymes, chants and so forth can be incorporated
2.	The theme of a SP must be able to provide for a possible music programme?
3.	A deep and unhurried voice must be used for audio cassettes
4.	Various materials can be incorporated
5.	Textured materials can be incorporated
6.	Perceptual-motor coordination techniques can be incorporated
7.	Assistive Technology from the Centre for Assistive Technology (2000) can be incorporated, for children, by means of:
7.1	Switch characteristics:
	Size of the surface "target" must be sufficient
	Amount of force (pressure) that is required for activation
	Amount of movement to activate

	Feedback of the switch whether tactile and/or auditory
	Durability of the switch
	Texture of the switch
7.2	Positioning options:
	Switch positioning in regard to the position of the child to the toy/device
	Switch placement on the toy/device
	Toy/device's close proximity to the switch
	Switch must be secured in a stable position
8.	Paper engineering (pop-ups) must adhere to the criteria of Dales (2007) by means of:
8.1	Movable parts must enhance the meaning of the text
8.2	It must be visually appealing
8.3	Artistic elements' quality must be on standard
8.4	Design elements must aid in creating a unique coordination between text and visuals
8.5	Text must be unobstructed by the mechanical parts
8.6	Movable parts must be durable
8.7	Pages must open and close with ease
8.8	Movable parts must be easy to manipulate
8.9	Tabs or other aspects which can be manipulated must be obvious to a child
The book element - Guidelines for children's books	
1.	Radical Change characteristics of Dresang (1999) must be incorporated by:
1.1	A plot trajectory that is not direct or straight
1.2	A multilayered reading experience through the incorporation of time switches and stories within stories
1.3	An interactive format
1.4	A multilayered perspective
1.5	Scenes from below, from above, to the side or from within the midst of the action
1.6	Effective reading instruction must be incorporated

Cornerstone 2: Supporting Factors	
The Toy Element	
1.	A toy/device should be appropriate for a child's developmental level
2.	A toy/device must be used as a reactive toy
3.	Toys must adhere to the criteria of Johnson and Smolken (1995) to ensure appropriateness for young school-age children by:
3.1.	Providing involvement, concentration and an element of chance which require certain skills
3.2	Some electric current can be incorporated, but not enough to overheat and result in burns
3.3	Children's school experiences must be expanded
3.4	It must promote interest and facilitate an individual child's skill
3.5	It must foster solo and group play
4.	Toys must adhere to the criteria set by the Consumer Product Safety Commission (1997) regulating toy safety regarding young school-aged children, namely:
4.1	Safe in relation to the construction and durability
4.2	It must be appealing and interesting
4.3	Consideration must be given in regard to physical capabilities
4.4	Consideration must be given in regard to mental and social development
5.	Toys must adhere to the criteria of Bailey and Wolery (1992):
5.1	Toys and play materials must be responsive
5.2	Toys and play materials must be age-appropriate
5.3	Toys and play materials must be adapted if necessary to increase engagement and learning
5.4	Play materials must include naturally occurring objects
5.5	Toys and play materials must promote learning of important skills
The Play and Play Therapy Element	
1.	Limit-setting must be incorporated
The Cultural Sensitivity and Socio-Economic Element	
1.	The SP must overcome communication barriers which result from cultural differences
2.	Play techniques must be in accordance with values and traditions of a specific culture

3.	Animal characters can be used to possibly overcome the communication barrier that exists due to cultural differences
4.	Cultural sensitivity in graphical elements must adhere to the criteria of Hugo (2002) by the selection of:
4.1	The colour combination
4.2	Graphical decoration
4.3	Typefaces that is used
4.4	Depiction of familiar cultural objects
4.5	Body features and body language of illustrations of people
4.6	Stereotypical presentation of behaviour
4.7	Level of graphic abstraction and silhouetting
4.8	Illustration sequence
4.9	Three-dimensional perspective of illustrations
4.10	Scale and zooming into a section of an object

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