

Educational Practices for Oral Health Promotion of Blind Students Using Three-Dimensional Tactile Book

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Abstract

The world we live is visual and visually impaired people have a unique way of knowing and recognizing what is around them. In this perspective, the study aimed to produce a three-dimensional tactile book with authorial history on oral health involving the theme caries. This study was developed at Benjamin Constant Institute, involving three blind students with ages between five and eight years old. The book produced was read to students who had the opportunity to handle it. The students read the stories to their family members who filmed the actions and sent them to the investigators of the study. We observed that the book contributed to the meaningful learning of students about oral hygiene.

Keywords

Childducation, Congenital Blindness, Inclusive Education, Toothdecay

1. Introduction

The activities of daily living are part of the routine and aim to make the individual able to meet their basic needs independently (Windholz, 2016). In the same vein, there are educational practices for independent living that are related to supportive work for the visually impaired person with the purpose of bringing them into contact with their daily activities, such as brushing their teeth, bathe, wear clothes, tie shoes, etc.

Siaulys, Ormelez, & Briant (2010) point out that it is important for the visually impaired child to have autonomy to know how to do their personal hygiene.

These authors emphasize that such activities are essential for the learning of the subject, who assimilates the customs of his people, at a certain time, and thus becomes considered a member of the social group to which he belongs.

Therefore, for the education of children with visual impairment it is important to develop pedagogical activities that contribute to the process of knowledge construction. For example, they need to know and understand the importance of hygiene and personal care (Siauly, Ormelez, & Briant, 2010). The construction of this knowledge can be accomplished by reading books.

The art of storytelling is a pedagogical resource used by many classroom teachers as an important and helpful element in the process of building knowledge and expanding the child's oral and written language.

The children's story delights and arouses pleasure, as well as piquing the curiosity of the individual. Abramovich (2004) highlights that the stories told allow laughs of situations presented, leading the child to find answers from curiosities, enabling to understand the world around them.

The use of tactile materials such as bi or three-dimensional textbooks can facilitate the learning of visually impaired students (Nuernberg, 2010). Actually, the adoption of the tactile book in schools is a resource that helps in the understanding of the didactic methods in the insertion of the student to the access to information and concepts capable of leading the learning in the construction of the knowledge (Souza, 2019; Souza et al, 2019; Tederixe, 2019).

The concept of tactile book, specific for visually impaired people, is polysemic. It can present multiple interpretations. At first, a book crafted by parents or teachers of blind children who intended to arouse the pleasure of reading in a playful way, as well as providing cognitive and imaginative development through illustrations (Valente, 2010).

The tactile book can be composed of different materials with the technique of *texturillustré* or texturizations, containing elements that can be removed and placed in the book. Characters or objects move between subsequent pages through cords, elastics, sticky materials and others (Claudet, 2009).

Through tactile books, relevant issues for early childhood education can be addressed such as the history and artistic work of a important painter like Kandinsky (Tederix, 2019) or the symptoms and prevention of chicken pox and of dental caries (Souza, 2019; Souza et al, 2019).

According to Losso, Tavares, Silva, & Urban (2009, p. 295), "dental caries are the most common chronic disease in childhood, consisting in a severe problem for worldwide public health. An important factor that must be considered is the fact that it can be prevented, controlled or even resolved."

Thus, the aim of this study was to produce a tridimensional tactile book on the theme of oral health and hygiene to contribute of the autonomous life of blind students.

2. Material and Methods

The study entitled "Three-Dimensional Tactile Book of Home Roaming for

Teaching Blind Children: A Playful Path in Health Promotion” was approved by the Plataform Brazil Ethics Committee (CAEE 08780819.0000.5243) and the Benjamin Constant Institute.

This was attended by three congenital blind students, regularly enrolled at the Benjamin Constant Institute, aged between five and eight years, two girls and one boy between five and eight years old.

These three students were invited to participate in the study because, unlike the others in the class, they had no other commitments than blindness.

The story produced by the authors involved the theme and is described in **Table 1**. The book had three pages of text and three pages containing three-dimensional material (**Figures 1-4**).

To make the book, we sought low-cost materials such as fabrics of different textures, bias, colored felts, Paraná paper, silicone glue, EVA, wool, wood, rings, miniature of objects. The text of the story was written in ink and Braille.

The methodology used was qualitative through and began after the consent of the participants (students and their families).

After this activity, each student had the opportunity to take the book home to read to his or her family members. The reading of the students was filmed with cell phone by their relatives and sent to the researchers.

Table 1. Text from the book Caries, Who Me?

Pages	Contents
1	Bento woke up early to go to school and when eating his breakfast, shouted: oh, oh, oh! My tooth hurt!
2	Bento had no choice but ran to the dentist. After being examined, the dentist said he had a small cavity on his tooth named caries. Bento asked: But what is caries? The dentist replied: It's a tooth disease caused by bacteria. When we do not brush our teeth, these bacteria feed on the remains of food, which are inside the mouth and then caries appears.
3	At the end of the appointment, the dentist told Bento to use his toothbrush, toothpaste and dental floss every day after meals and before going to sleep so that his teeth would no longer get sick.
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Figure 1. Cover of the book *Caries, Who me?* (Cárie, eu? in portuguese).

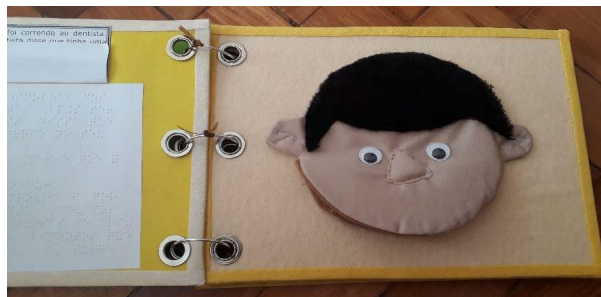


Figure 2. Illustrations of Bento's face.



Figure 3. Illustrations of Bento's face showing the caries.



Figure 4. Illustrations showing the dentist with toothpaste, a toothbrush, and dental floss.

3. Results

While the researcher told the story, there were some immediate reactions from the students. For example, the enchantment of some to realized that there were

true elements in the book. They tried the dental floss in their own mouth and when retelling the story to their family they were able to identify the elements, narrate in their own way, without escaping the context of the work presented by the researcher.

The following data are derived from the transcription of the videos and reports that each family sent to the researchers.

3.1. Reading of Student Identified with Letter A

“Once upon a time Bento was having breakfast. When he bit the sandwich, he shouted oh my, tooth, it hurt! (The child appears in the footage groping the elements of the book page that make up Bento’s coffee table. The student turned the page and continued to count). Bento ran to the dentist. Arriving at the dentist, the dentist said he has to brush his teeth after meals before bed (the student turned the page of the book and continued) and groped the character’s teeth, then turned the page again and continued to tell the story.) The doctor said he should brush his teeth before meals and when he went to bed.”

3.2. Report of the Student’s Mother Identified with Letter A

“When he felt the scene of the story portrayed on the pages, he was simply impressed to show that it was all there in miniature. His joy was radiant. He said “this is a real book”, because all the books that had contact did not show the scenes and images when playing, it was different and interesting for him who wanted to tell even his aunt and cousin the story, feeling the smell of coffee he shouted “Look mom is coffee, I smelled it, I felt it.” I as a mother couldn’t help but feel my son’s happiness in deciphering a book, understanding and feeling the scene of a story. This was so happy for me, because we still have to go a long way and know that there is a light at the bottom of the tunnel, a teacher who thinks of a real inclusion is priceless. For a world where everyone fits, please!!!!”

3.3. Reading of the Student Identified with the Letter B

“Once upon a time,” Caries, who me? “Here it is written in ink and Braille (at this time, the child appears in the film groping the cover of the book). Here, Bento was drinking the coffee. Here is a piece of bread and is a piece of cake, here is the cup of milk, here the cup of coffee and here is the donut, here and the hole (the student appears in the footage groping the elements, from the second page of the book, naming everything to her mother). Then student said My tooth hurts! (student goes to third page). This is his mouth, his mouth (the student appears rubbing the character’s teeth). This is the dentist, he examined. Then he examined Benedict and said, “You have caries.” Caries is a bug that hits your teeth when you eat things and doesn’t brush your teeth. Then he passed Bento a toothbrush, he passed Bento a paste, toothpaste, and Bento flossed it. What do you see? He is for real! Here, do you see the thong in here? So that’s what the dentist told Bento to do all this so he wouldn’t get caries.”

3.4. Report of the Student's Mother Identified with the Letter B

"She loved the book because it is tactile. She can feel the characters, the coffee-smelling cup. She even loved it and most importantly she learns from history a lesson in brushing her teeth after meals. Congratulations for the work that was super beautiful and interesting for a child with visual impairment. She wanted me to make a book like that for her."

3.5. Reading of the Student Identified with the Letter C

"Bento woke up early to go to school. As I ate breakfast he said there, then, my tooth hurt! Had no choice, had to go to the dentist. I turned! (the student said turning the page of the book and groping the teeth of the character). When examined, the dentist said You have caries. What is caries? Caries are bacteria that stick to our teeth when we feed on food scraps when we don't brush. Let's turn around! (said the student, turning the page and continuing the narrative). The dentist had a toothbrush, toothpaste and flossing brushed after every meal and before bed. The end!"

3.6. Report of the Student's Mother Identified with the Letter C

"My daughter loves to hear and tell stories. She loved the book. It has a wonderful format!"

We observed that during the transcription of the video show much the students explored the three-dimensional elements of the narrative to appropriate the context of the story when they retelling it for their families.

There were those who groped more, others less, some returned the pages when they felt the need to complement the narrative, or even those who interacted with the characters in the stories, such as brushing Bento's teeth and even flossing their own tooth.

In telling the story to his family students groped the exciting and curious way of elements. For example an attempt to recognize and differentiate the three dimensional elements of the story.

However, he quickly groped more closely and corrected the narrated speech very naturally. Students demonstrated with smiles or the pleasure of touching the elements of the book and the joy of realizing that some of these items were true.

4. Discussion

The book with three-dimensional images played a very important role as a facilitating means in enabling the student to feel the information about the narrative (Souza et al., 2019) because through touch the blind child captures information that is fundamental for knowledge and interaction with the world around him (Nuernberg, 2010; Vilaronga & Souza, 2016).

Thus, the experience with the book, in fact, brought contributions to the personal cleanliness of blind children and an expansion in the construction of knowledge regarding the essential care for health promotion, like the applicabil-

ity of a three-dimensional tactile book on the consequences of chicken pox and its prevention (Souza et al., 2019).

As in the present study, the three-dimensional tactile book produced by Souza et al (2019) had been successfully tested with only three children. However, we intended to test the book about dental caries in other schools to involve a greater number of congenital blind children at the same age group.

We observed that the development of blind children will be defined based on the volume and quality of experiences to which they are submitted (Almeida, 2014), especially through tactile materials (Cerqueira & Ferreira, 1996).

The book we produced encourages the children to reinvent history by using their own language. This result highlights that whatever is experienced by the student will be apprehended but what is not will be forgotten (Gonçalves et al., 2008). As expected, the stories sharpen new possibilities for the construction and apprehension of new knowledge (Abramovich, 2004).

At the same time, studies indicate that it is possible, through stories, for children to know, recognize the world and thus develop their imaginative capacities (Oliveira et al, 2017; Tederixe, 2019). It is an excellent tool that acts as a mediator for the construction of concepts in all areas of education and promotes social, cognitive and emotional development. The mere fact that the blind child manipulated books, listened to stories, manipulated three-dimensional images, provided them with an explosion of interpretations (Souza, 2019; Souza et al., 2019).

This study followed this path, thinking about the relevance of the adaptations of the illustrations contained in the children's books, in order to offer a more real approach between the images and the blind reader, by not making a simple representation of drawn images.

However, it was found that the three-dimensional tactile book can serve a wider spectrum of possibilities than the two-dimensional book, covering in detail the construction of tactile images that favor representativeness (Nuernberg, 2010).

Thus, it has been shown that every child needs to be led to discover their possibilities as protagonists of their own learning, but for this to happen, they need to be encouraged, stimulated for such results. In this sense, it is worth highlighting the mention of Preto (2009) in stating that the active contact of the individual with the environment and everything around him are important to build knowledge and develop concepts.

We conclude that the adoption of the three-dimensional tactile book in schools is a resource that helps in the understanding of didactic methods and in the insertion of the student and in the access to information and concepts capable of leading learning in the construction of knowledge about personal care like oral hygiene.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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