Tactile Graphics to support emergent literacy the BLENNZ way

Over the past four to five years, BLENNZ have been working on developing a Tactile Graphics Curriculum, that is designed to support Resource Teachers Vision (RTV) and learners so that they are able to participate in an inclusive learning environment. This curriculum consists of the BLENNZ Tactile Graphics Pedagogy, and two guides, Part 1: Development of Early Tactile Graphic Skills, and Part 2: Development of Tactile Graphic Skills for Mathematics.

The BLENNZ Tactile Graphics Pedagogy consists of five principles. They are:

1. To develop understanding body concept and spatial orientation in relation to objects in space.


2. To offer real life experiences or use models, providing opportunities to manipulate and explore objects. This forms a vital link to the understanding of a graphic.
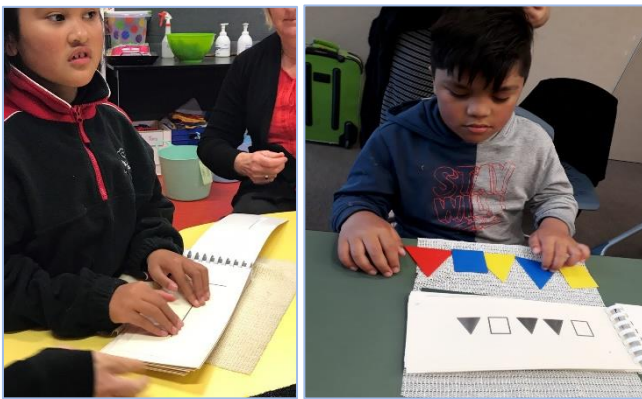

3. Reducing the complexity in a diagram or graphic for easier interpretation by:
    i.   Presenting the graphic in either a top view, or a side view

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ii.   Introducing a graphic by adding detail sequentially.
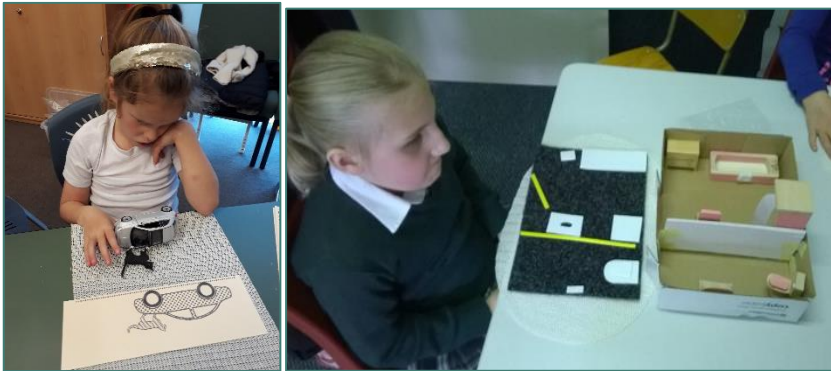
4. Developing knowledge and understanding of the 'language of lines' and their spatial orientation on a page.

5. Giving our learners time – to explore and understand tactual information, and time from us as their educationalists.

The guides provide a scaffolded approach with detailed information, ideas and strategies of how to teach tactile graphics to our young learners, as they begin their formal schooling. They are linked to the New Zealand Curriculum, and cater for Level 1 learners, which is the first two to three years of formal schooling. The Development of Early Tactile Graphic Skills, Part 1 is presented to develop two primary concepts. They are:

- Concept 1: Body Concept, Spatial Awareness, Position in Space
- Concept 2: Developing Understanding of 2D presentation
    - 2.1 – Develop knowledge of shape, textures and lines.
    - 2.2 – Develop understanding and skills that lead to interpretation of a graphic to support literacy and mathematics.

The information is provided under the following headings: 'What do learners need to be able to do', and 'Progression and Strategies'.

The Development of Tactile Graphic Skills for Mathematics, Part 2, include the mathematics strands Geometry, Measurement, Statistics, and Fractions. The intention is to teach our learners who are blind, to have skills to participate, and to be able to interpret and respond to raised line graphics, at the same time their sighted peers are receiving and responding to print worksheets, resources and assessment.

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The importance of early exposure to develop understanding of material presented in tactile format is essential, and we needed to find ways to ensure that our learners were introduced and learned to interpret graphics from an early age, so that when they are given assessments, they are not disadvantaged by the fact they are simply not able to read the graphic.   We knew that many of our students had good decoding skills, but did not always have good comprehension of what they had read.

We began to look at how our early instructional readers were being illustrated. There was an inconsistency in their presentation, with some presented in collage, some very complex that lacked meaning for our learners, and some using simply a tactile clue. Using black and white images from Google was often used as a quick fix for Piaf images. Time is always a factor for Resource Teachers Vision (RTV), and we started thinking of a way we could do this smarter, one that developed tactile skills within the reading program, as well as concepts to improve comprehension. Reading is something that our learners do every day, and integrating good quality graphics within the reading program could provide our learners with regular exposure to improve their interpretation and understanding of raised lines, and for this skill to become second nature, as printed images are for sighed learners.

And so the idea of creating a library of images to be able to illustrate these early readers came about. We needed a collection of images that were suitable for use as a raised line graphic. Due to the variety of readers used, this is designed as a generic library that can be used to illustrate any book. We contracted an illustrator to draw these for us, trying to ensure they were presented to make their interpretation easy, but at the same time, teach the form of that object. The plan was to have graphics that were consistently presented in the readers, using distinguishing features in some cases, so that a learner could quickly recognize them, and that would provide meaning to the text.
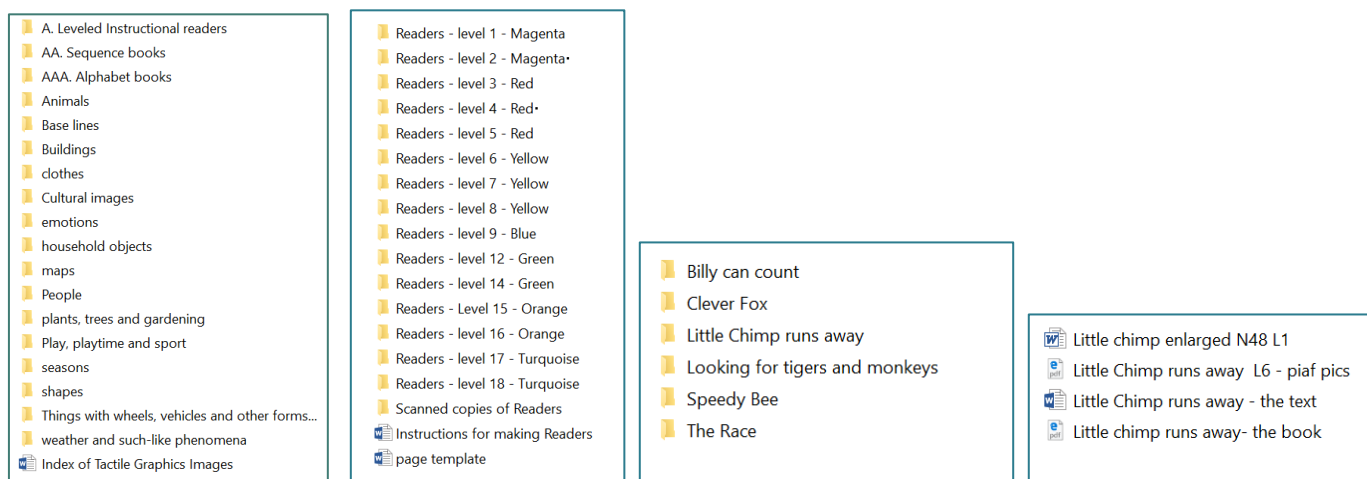

Figure 1: the front page of the BLENNZ Tactile Graphic Image Library.

Figure 2: a screen shot of Folder A: Leveled instructional readers.

Figure 3: a screen shot of the books available in Level 6.

Figure 4: a screen shot of the files inside a book folder.

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Following a trial and many alterations of images and format of the books, we now have a collection of books at each reading level of our reading scheme that Resource Producers (RP) around the country can download and produce for a learner. New books are being added as they are made. BLENNZ have a shared space in which this library is located. Books are saved in a folder within a reading level, and the folder contains the text file for embossing, and the picture file to Piaf. Resource Producers follow strict guidelines on the production of the books, so that all learners around New Zealand are receiving the same quality and format of books.   All books are presented models or real objects, in line with principal two of our Pedagogy.
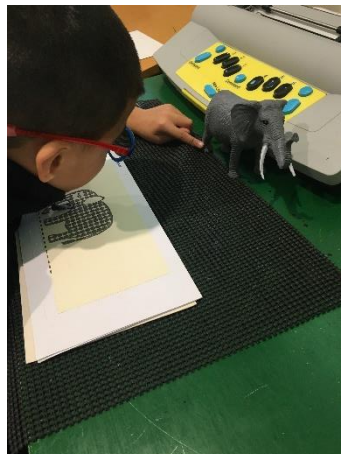

The process involved in teaching learners to interpret the graphics evolved as our collection of books grew. Our learners needed 'alphabet books' to teach initial sounds and the recognition of the braille letter. When developing the alphabet book collection, we realized that these young learners needed more help to interpret some very complex graphics. A collection of 'sequence books' were made that introduced the graphic sequentially. This of course, is one of the ways of reducing complexity of a graphic, principle three of our Pedagogy. We have a sequence book for each letter of the alphabet. As our guiding philosophy is always to move from the real experience or if not possible a model for exploration and manipulation, each new alphabet letter is presented with a collection of objects, matching the graphic in the sequence book, and also each image in the alphabet book.

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Developing body concept and its spatial orientation in space, and in relation to objects is an essential step in understanding a graphic on a flat surface, and the first principal of our Pedagogy, and forms the backbone of a learner's understanding of a graphic. Activities such as playing with a doll or mannequin, copying body positions all work towards the recognition and understanding of the presentation of a person in a picture. Our books are illustrated by a collection of 'people', differing only by their hair, making it easy to work out who is who.
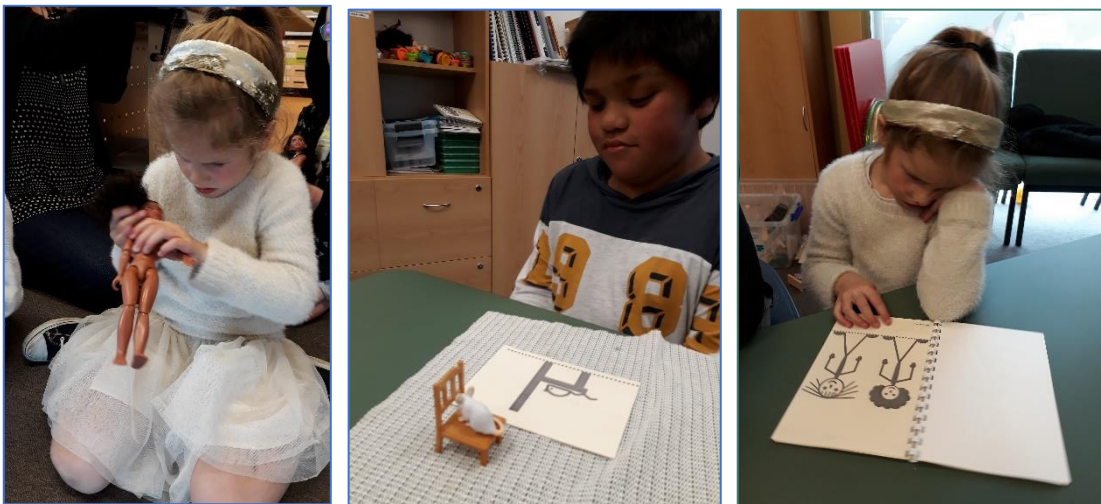
Last but not least, is the development of the language of lines, principal four of our pedagogy. Any graphic is made up of lines and textures, and these need to be taught in a scaffolded and sequential manner to enable our learners to understand them. We have developed a resource called 'Kiwi Lines Tactile Program'. It consists of Part 1 and Part 2, and works alongside the Part 1 and Part 2 guides. We also have three sets of cards that support the books. These can be used to play games like bingo, matching games, or to teach and support tactile discrimination. There are three sets, Set 1 made up of solid shapes, Set 2 with lines, and Set 3 with them all mixed together, catering for different skills and levels. The use of language to describe the lines, shapes, textures and their position on the page go hand in hand with their tactile recognition.
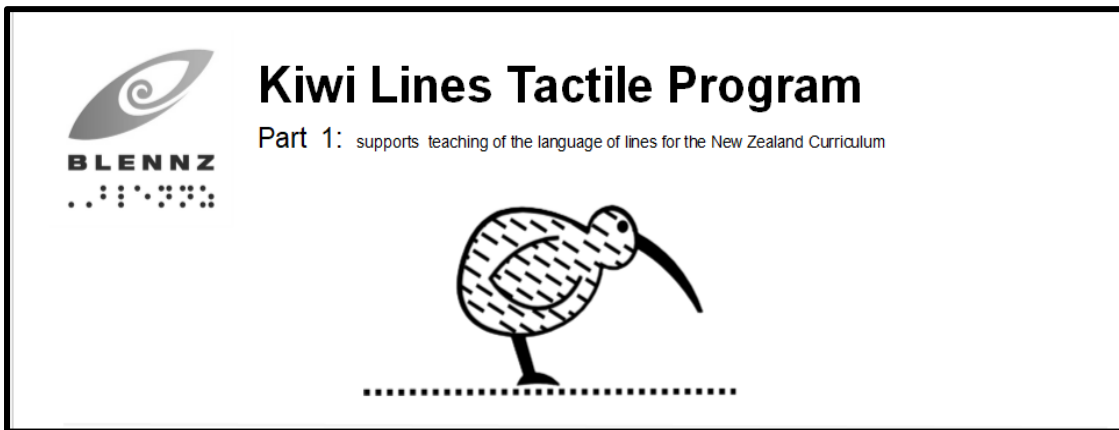
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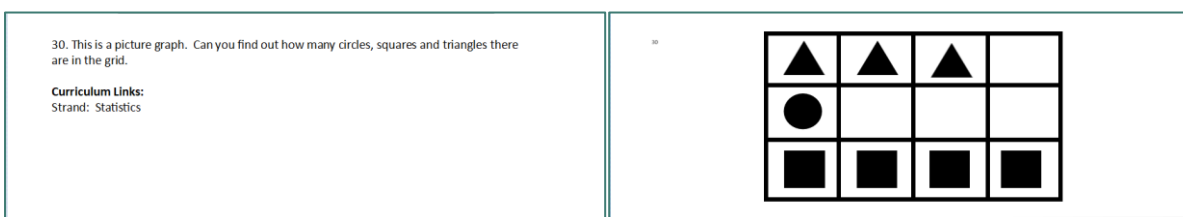Figure 1: the front page of Kiwi Lines Tactile Program Part 1.

Figure 2: an example of a page from Kiwi Lines Tactile Program Part 2.

The outcomes of the tactile graphics image library, and its use in instructional readers has been multi-faceted. It takes more time to get through the books, and this can only be seen as an advantage. There is no doubt using these books have improved comprehension of what is read. This is partly because the graphics initiate much discussion in relation to the text, but also as a result of the unplanned manner in which the discussions often lead. The books presented in this manner enlightened RTV working with the learner, of gaps in concept knowledge that they had been unaware of. The books are interactive, fun and interesting for the learner, and the RTV. They facilitate incidental learning, something that a learner who is blind does not easily come by, was one of the biggest spin-offs of this project. One young learner, when reading said," I didn't know worms live underground – I thought they lived in trees". Exploring the graphics in these books initiates discussion on where objects are on the page, and calls on knowledge in relation to body concept and positional language, putting the Kiwi Lines tactile program into meaningful practice. The recognition of the graphics is initially time consuming and slow, but as time goes on, recognition of objects and characters becomes quicker. We have been careful not to have variations of the graphic, as this increases complexity of recognition.

Another unexpected spin-off has been the benefit to those learners who have severe low vision. The high contrast images lacking in complexity and their consistent but simple design has provided this group of learners with instructional readers that are visually accessible. Implementing our philosophy of always using real experiences or by exploring real objects is always essential when working with learners who have additional needs. It has enabled RTV to design a program that fits in with a regular curriculum, but using resources and strategies that match and support their developmental level. One of our young learners who is blind loves the alphabet books that have been made using three dimensional objects. He may never move onto

recognizing these in raised line graphics, but he has developed alphabet knowledge in an interactive and meaningful manner.
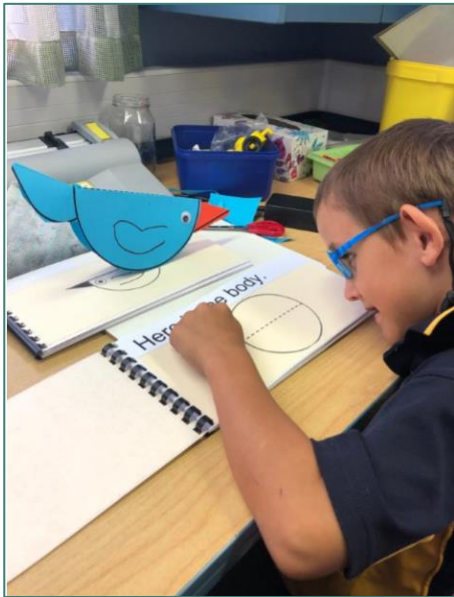
The BLENNZ way of integrating Piaf graphics in our instructional readers, supported by our Tactile Graphics Pedagogy, compliments our active learning approach, providing a meaningful multi-sensory program to support learning.

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