The effect of ‘Six Bricks’ guided play on grade two learners’ visual perception and reasoning abilities

A PhD study in South Africa by Amina Brey

This report provides the backgrounds and findings of a research study conducted over a period of six months investigating the possible effects that play using the Six Bricks approach has on the development of grade two learners’ visual perception and reasoning abilities.

Overview of the study

The tool used in the study, Six Bricks, comprises of a set of LEGO® DUPLO® bricks in six bright colours (red, green, yellow, dark blue, light blue and orange). It is a simple tool to introduce learning through play, through fun and short activities through which children can practice a variety of skills. The activities are designed to be repeated daily and are thought to develop mental readiness in which the child focuses and concentrates for a limited period. The activities are thought to promote the development of social and emotional areas, language and mathematics, and executive functioning skills. The activities are also thought to develop sensory and perceptual skills which include; tactile discrimination, gross and fine motor skills, memory skills, and auditory and visual perception (Hutcheson, Frank, & Smith, 2014). These short activities are teacher-guided, but open-ended with plenty of opportunities for children to control and direct their own learning.

Visual perception

Research indicates that 80% of the information we take in comes through the eyes, 80% of visual processing is responsible for what we see and 20% is responsible for where and how we see, and 75-90% of classroom learning depends on vision (Kranowitz, 2005). Visual perception is one of the major perceptual senses in human life (Yu, 2012). It plays a fundamental role within the academic environment, enabling learners to acquire reading, writing, spelling and mathematical proficiency (Clutten, 2009). It is also required to successfully carry out most activities of daily living, such as dressing, brushing teeth, cooking and driving (Richmond, 2010).

Within the South African context, Clutten (2009) identified nine aspects which she included in the design and development of a Visual Perceptual Aspects Test (VPAT); namely, visual discrimination, visual form constancy, visual memory, visual sequential memory, visual spatial-relationships, position-in-space, visual closure, visual figure-ground, and visual analysis and synthesis.

Exploratory talk

Mercer, Wegerif and Dawes (1999) found that learners’ understanding and learning could be improved if they were introduced to a form of talk where they engaged critically and constructively with each other’s ideas. Alexander (2008) postulated that it is possible to exploit the power of talk, both between teacher and learner and between learners, to shape learners’ thinking and to secure their engagement, learning and understanding. It has been perceived as an important educational tool for guiding the development of understanding and for jointly constructing knowledge (Mercer & Hodgkinson, 2008). This form of talk “where knowledge is made publicly accountable and reasoning is visible in the talk” (Monaghan, 2006, p. 13) is known as ‘exploratory talk’ (Barnes & Todd, 1977). Exploratory talk is therefore seen as a social mode of thinking (Mercer, 1996) orientated towards a shared inquiry, enabling learners to explore different viewpoints and ideas within a group. Learners try to solve problems together until a common understanding is reached (Rajala, Hilppo, & Lipponen, 2012). Some of the words commonly associated with exploratory talk are ‘why’, ‘what’, ‘but’, ‘because’, ‘I think’, ‘I agree’ and ‘let’s’ (Wegerif & Mercer, 1997).

Study Design

Data were generated both quantitatively and qualitatively. Quantitative data were generated via pre-post-analysis of two tests, namely, the Visual Perceptual Aspects Test (VPAT) to measure the impact of Six Bricks activities on learners’ visual perceptual aspects, and the Raven’s Coloured Progressive Matrices (RCPM) test to measure the impact of Six Bricks activities on learners reasoning abilities. Qualitative
data were generated via researcher observations, teacher record sheets and teacher interviews.

The sample included 15 Grade 2 teachers and their learners (3 classes per school) in five purposively selected schools. Teachers of classes 2 and 3 were requested to complete three activities per week (visual perception). In addition, teachers of classes 3 were requested to complete one additional activity per week (exploratory talk). This meant that:

- 5 teachers received no training and their learners (classes 1) acted as the control group;
- The remaining 10 teachers received training on the Six Bricks activities to develop visual perception (classes 2 and 3);
- From these 10 teachers, 5 received additional training on the Six Bricks activities to develop reasoning abilities (classes 3).

The Findings

**Effect on learners’ visual perception**

The intervention, as designed and implemented, saw improvements in terms of learners’ visual perception. Statistically significant improvements were found in the experimental group’s pooled VPAT subtest scores as opposed to only three for the comparison group’s VPAT subtest scores.

**Effect on learners’ reasoning abilities**

Equally, the intervention, saw improvements in terms of learners’ reasoning abilities. Statistically significant improvements in mean scores were achieved by some schools in the exploratory talk experimental group for the RCPM test.

In addition, the study showed that some notable effects did emerge over the six-month intervention.

**Visual perception**

Teachers felt that the visual perceptual aspects transferred across into the classroom in some way or another. Some teachers felt that learners improved in their assessments (e.g. phonics) or copying from the blackboard, some felt that being able to visualise during the activities assisted their learners to transfer these acquired skills and concentrate more on other school-related tasks.

**Exploratory talk**

The biggest obstacle was time constraints, with learners requiring more than the allocated time to complete the activities. Arguing, fighting, dominance, stubbornness and non-participation prevented groups from adhering to all the rules. Gradually this improved as learners began to grasp what was expected of them.

**Spatial vocabulary**

Teachers were surprised at the spatial vocabulary their isiXhosa first language learners used. Vocabularies included words such as left, right, more, less, half, quarter, bigger, smaller, upside down, turn onto long side, and turn onto short side.

**Teachers’ observations**

Teachers noted that the learners were enthusiastic, had fun and enjoyed the activities. They reasoned that the activities were so varied that the learners looked forward and loved it each time they played. Learners remained focused and engaged and enjoyed having something tactile to work with. Learners showed more discipline, self-regulation and inhibitory control as the intervention progressed.

**Social skills**

Teachers noted that by playing with the ‘6 Bricks’, learners learnt social skills, listening skills, communication skills, to remember instructions, to take turns, to share ideas, to work in a group, to come up with a plan, to solve problems and to look at things more analytically.

**Further research proposed**

- Engaging in similar research on a larger scale, e.g. with more schools, a greater variety of schools such as urban and rural, and a larger number of learners,
- A longer duration for testing the intervention might produce more nuanced results;
• Carry out a similar longitudinal study from Grade R to Grade 3;

• Identifying the efficacy of activities designed to develop specific areas of visual perception;

• Deeper probing of teachers’ experiences and perceptions regarding the Six Bricks’ approach;

• Measuring the relationship between visual perception and reasoning abilities and the development of learners’ numeracy and literacy abilities

References


Accessing the full PhD dissertation

The full PhD dissertation can be accessed by searching for the title, or by following this link:

http://ir.nrf.ac.za/bitstream/handle/10907/1562/brey_effect_2017.pdf?sequence=1&isAllowed=y