12 Rethinking approaches to occupational therapy intervention: Learning in and from an under-resourced school

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Primary school learners in South Africa, similar to elsewhere, spend a large portion of their day engaged in the occupations of learning (Chapter 5, Silbert & Galvaan) with handwriting being central to this. This chapter presents a description of an occupational therapy intervention that aimed to improve the performance of learners at Intshayelelo Primary, one of the Schools Improvement Initiative (SII) partner schools, in the occupation of handwriting. It reveals the ways in which aspects of playfulness, contextual fit and teacher partnerships were drawn on to strengthen the impact and sustainability of the aforementioned intervention. Overall, the reflections on the intervention development and implementation offer a critique of the performance-orientated focus adopted in the intervention. Possibilities are suggested to shift the focus of occupational therapy interventions towards addressing the learners’ participation in the occupation of handwriting. This continued reflection and critique on existing practices is encouraged in order to enhance occupational therapy practice with children.

Traditional occupational therapy practices in schools

In South Africa a large number of occupational therapists work in private practices located in well-resourced mainstream schools (Van der Merwe et al. 2011a). South African occupational therapists assess and provide interventions aiming to address difficulties that learners may experience with handwriting (Naidoo et al. 2009; Van der Merwe et al. 2011a). Interventions offered by occupational therapists working in schools have not been described in detail in the available literature. There is research describing how South African occupational therapists in private practice assess and treat poor handwriting in Foundation Phase learners (Van der Merwe et al. 2011a; Van der Merwe et al. 2011b). Occupational therapists are employed by the Department of Education in the public sector. They have historically been located in schools that cater for learners with special educational needs. The Education White Paper 6 on Inclusive Education (DoE 2001) attempts to promote various avenues of support to address the vast inequalities in the public education system, and promote access to quality education for all South African learners. This policy refers to barriers to learning, a term which encourages a focus not only on the learners’ internal barriers (intrinsic performance components), but also on the external...
(contextual) barriers that impact on learners’ access to, and engagement in, learning occupations. One of the mechanisms by which this extended focus is put into place is through the creation of district-based support teams (DBSTs), which are groupings of health and educational professionals whose mandate is to work in partnership with public schools to promote learning opportunities for all. Occupational therapists can, but do not always, form part of the DBST.

Members of the DBST provide various layers of input to address the needs of learners experiencing internal and external barriers to learning within schools that have been identified as needing, or that have requested, additional support. Learners particularly impacted are those attending under-resourced schools. The various external barriers present in under-resourced schools include challenges relating to the curriculum, teaching approaches and limited support for learning (Chapter 2, Clark). External barriers to learning can also include environmental and ergonomic factors such as poor lighting and ventilation, distance of the desk from the chalkboard, poor sitting position, incorrect desk and chair height and limited writing materials (Van der Merwe et al. 2011a). Internal barriers to learning refer to factors intrinsic to the child, and include a variety of sensorimotor, cognitive and psychosocial performance components that can hinder a learner’s success in learning occupations. Being part of the DBST extends the potential role and scope of occupational therapists in schools. They can facilitate inclusive education; assist with school-related assessments; support learners with special educational needs; and consult with parents and teachers to provide training and education in how to adapt the home and classroom environment (Sonday et al. 2012; Struthers 2005).

However, the abovementioned policy framework and mechanisms of support are poorly implemented. The inputs provided by occupational therapists in the DBST are frequently positioned in a deficit, skill-based approach. This could be due to the fact that occupational therapists working in mainstream schools are not provided with sufficient guidance to structure their support to address the various external barriers that impact on the learners’ engagement in learning occupations (Sonday et al. 2012). This contributes to their adoption of intervention approaches that focus mainly on addressing the performance of learners in their learning occupations.

**Occupational therapy interventions addressing handwriting in under-resourced schools**

Handwriting-associated learning tasks typically given in the classroom include copying work from the chalkboard or other written sources; expressing ideas through stories; completing mathematical equations; and demonstrating knowledge of various subjects through written tests. The curriculum outlined in the Curriculum and Assessment Policy Statement (CAPS) makes provision for the systematic teaching of handwriting in short periods for approximately
'15 minutes per day, four times per week’ (DBE 2012: 9). A summary overview of the educational instruction follows:

- **Grade R:** Learners follow a pre-writing programme to develop their sensory motor and perceptual motor skills. Learners are taught the correct pencil grip and how to form the letters. This includes instruction on the starting point, size, shape, and direction of movement required for each letter and number.

- **Grade 1:** Formal handwriting instruction begins. Learners learn to position and space letters on and between the lines. By the end of Grade 1 learners should be able to form all the lower and upper case letters correctly and fluently, and copy sentences correctly from the board or from written examples. Grade 1 children begin by writing on blank paper using wax crayons. In time they progress to writing on 17mm lines using pencils for formal handwriting lessons, although many schools prefer to continue using blank jotters for other written work even in Grade 2.

- **Grade 2:** Learners develop greater speed in writing print.

- **Grade 3:** Learners transition to write a form of joined script or cursive writing during the first half of Grade 3. Whilst the choice in regard to the handwriting script remains with a school/province, children should be taught to write a form of joined script or cursive writing by the end of Grade 3. In Grade 3 children make the transition to using 8.5mm lined books. The exact time for these transitions will depend on the level of the children and the school’s policy (DBE 2012: 12).

A learner’s performance of handwriting is measured in terms of the quality and quantity of their written work reflected in various learning tasks (Van der Merwe et al. 2011a). The outline above confirms that an emphasis is placed on providing learners with graded inputs that develop their skills in the mechanics of handwriting – building on their formation of letters, shapes and numbers, legibility and speed of handwriting. The internal and external barriers to learning, described above, can impact on a learner’s participation in, and performance of, handwriting. Handwriting represents both participation in, and performance of, learning so learners have to master multiple skills to demonstrate their performance. One skill shown to be a significant predictor of a child’s handwriting development, and their ability to copy letters and numbers accurately, is visual motor integration (VMI) (Brossard-Racine et al. 2011; Naidoo et al. 2009; Visser et al. 2017). VMI is an intrinsic performance component that a learner requires in order to receive, interpret and integrate visual images (commonly referred to as visual perception) (VP). This, in turn, is necessary in order to output a motor response of a letter or number written on a page (commonly referred to as motor coordination) (MC).

Occupational therapists working in schools offer various interventions to develop learners’ VMI, VP and MC skills as a means to promote their performance in the
occupation of handwriting (Van der Merwe et al. 2011a). This positive relationship is notably more significant in primary school learners, who tend to rely more on visual feedback and motor information to guide their movements to form and copy shapes, letters and numbers (Klein et al. 2011; Overvelde & Hulstijn 2011).

Occupational therapy interventions addressing the external barriers to learning are not extensively presented in occupational therapy literature.

The next section describes the evolution of an occupational therapy service for learners attending Intshayelelo Primary. The need to develop this service arose from the results of a series of occupational therapy screening events with the school's learners. These events and the outcomes thereof are presented below.

**Description of occupational therapy practice at Intshayelelo Primary**

In late 2012 the head student (an occupational therapy student) of the health and rehabilitation sector of the Students' Health and Welfare Centres Organisation (SHAWCO) and the SII project manager approached the final-year occupational therapy course convener with a proposal requesting the assistance of occupational therapy staff and students with the screening of Grade R learners who, according to their teachers, were experiencing difficulties with their handwriting skills. The aim of the screening was to identify if the internal performance components of VMI, VP and MC, were contributing to the poor performance of learners in their school-based handwriting tasks. The focus of the intervention on addressing these internal performance components to promote the handwriting performance of the learners will be reflected on later in this chapter.

The first screening took place in late January 2013. Consent forms were sent to the caregivers of all the Grade R learners at Intshayelelo Primary. In accordance with literature supporting the value of early intervention for handwriting (Van der Merwe et al. 2011b), Grade R learners were selected as the most appropriate group to be screened. This was done in order to determine and support their preparedness for handwriting from the onset of their schooling journey. Those Grade R learners whose caregivers provided consent were screened using the short form of the fifth-edition, norm-referenced Beery-Buktenica Developmental Test of Visual Motor Integration-Fifth Edition short form (DTVMI) (Beery & Beery 2006). The DTVMI is a standardised assessment tool widely used by occupational therapists to assess visual-motor integration skills (Brown et al. 2007; Van der Merwe et al. 2011a). The DTVMI has been demonstrated to be particularly useful for the assessment of writing readiness in five- and six-year-old children (Marr & Cermak 2002; Van Hartingsveldt et al. 2011) and is described as a valid measure of VMI (Goyen & Duff 2005; Parush et al. 2010). Beery and Beery (2004) report good psychometric properties for the DTVMI, including a test–retest reliability correlation of 0.92 and an inter-rater reliability ranging between 0.92-0.98.
The DTVMI is described as a reliable and valid measure of VMI abilities that does not show differences for gender, residence or ethnicity (Beery & Beery 2006) but is sensitive to income status (Frey & Pinelli 1991). Due to the fact that the screening took place in an under-resourced school, consideration of income status was important.

Data collection took place at the school, in a large, well-ventilated room near the learners’ classrooms. The final-year student occupational therapists, who had been trained in standardised instrument use, administered the DTVMI (5th edition short form) to the learners in small groups – ten learners per group – in strict accordance with the DTVMI administration protocol outlined below (Beery & Beery 2006):

Visual-motor integration: Each learner’s task was to copy different geometric shapes that become progressively more complex and challenging to copy. The first three test items consisted of three types of scribbling. The next three tasks required the learner to imitate the same three shapes drawn by the assessor (that is vertical line, horizontal line and circle). Then the learners copied 15 developmentally sequenced geometric shapes. The test was terminated after three consecutive errors, in accordance with administration criteria.

Visual perception: Learners were shown the same 15 geometric shapes and given two to seven alternatives from which they needed to choose the correct one for each shape presented. The test ended after three consecutive errors, or at the three minute time limit.

Motor coordination: Learners traced a trail within progressively smaller paths while staying in the lines of the same fifteen geometric shapes. The test was terminated at the five minute time limit.

The administration time was approximately 10 to 15 minutes per child. The assessments were conducted in the morning to minimise the impact of fatigue on the assessment results. School staff – and occupational therapy students who were competent in isiXhosa – assisted with the presentation of the DTVMI instructions to the learners.

To ensure accuracy in scoring the DTVMI assessments, 30% of the assessments were independently scored by an experienced occupational therapist who did not participate in data collection. The raw score for each child was converted into a standard score according to a scale based on the child’s age. Standard scores indicate a level of performance that is adjusted for age. The mean standard score of the total sample for each of the three components of the DTVMI was calculated and presented to describe the performance of the learners in VMI, VP and MC.

This initial screening revealed that the Grade R learners were experiencing significant challenges in their VMI, VP and MC skills. The initial plan was to use this screening information to secure appropriate and ongoing support for the learners in the student-run SHAWCO clinics that took place monthly in the area.
The screening outcomes, however, revealed that many learners (more than half) identified as experiencing difficulties with VMI, VP and MC skills. Due to logistical factors relating to short staffing in the SHAWCO clinics, providing occupational therapy interventions through this means would not be possible. The occupational therapy students and supervisor involved in the screening process suggested it would be more feasible to make use of Intshayelelo Primary as a practice learning site for the final-year occupational therapy students for their child learning, development and play (CLDP) practice learning block. The head of SHAWCO, the site-based supervisor, the SII project manager and the final-year student convener agreed with this plan of action.

The final-year CLDP students commenced practice learning in February 2014. They drew on the data generated in the 2013 screening process to design and implement individual and group treatment for the learners who were now in Grade 1. These interventions were provided by the final-year occupational therapy students, and took place outside of the context of the learners’ classrooms. The focus of the interventions aimed to improve the learners’ performance in handwriting via intervention strategies aiming to build on the performance components of VMI, VP and MC.

In January 2015, a review of the CLDP occupational therapy services provided at Intshayelelo Primary took place. Feedback from the supervisor and students identified what shifts in the intervention were necessary. These shifts included further consideration of how the interventions targeting handwriting could be more closely linked to the curriculum expectations for handwriting for Grade R learners. The feedback also highlighted the need to identify ways to enhance the sustainability of the intervention through creating partnerships with the Grade R teachers, and improving the participation of learners in the intervention.

Partnering with teachers for classroom-based interventions is not common practice in South Africa. Learners are predominantly seen by occupational therapists on an individual basis (Van der Merwe et al. 2011b). Evidence, however, supports the effectiveness of classroom-embedded and teacher-partnered occupational therapy interventions for handwriting (Case-Smith et al. 2014). This evidence informed the revision of the structure of the interventions. The final-year occupational therapy students and their supervisor met with the Grade R teachers to explore whether it would be feasible to implement their interventions within the classroom context. The educators welcomed this idea, as handwriting falls within the literacy area of the Grade R CAPS curriculum. The students and supervisor engaged with the Grade R teachers to explore and learn more about the curriculum content for Grade R literacy. They jointly decided to align the intervention with the weekly curriculum themes and specific learning outcomes outlined in the literacy area of the Grade R CAPS curriculum. It was agreed that the students would facilitate 30-minute classroom-based intervention sessions in each of the four Grade R classes, during the allocated CAPS literacy curriculum slots. The sessions were implemented four times a week over three seven-week practice learning blocks across the year.
To further refine the content of each of these sessions, the students and supervisors shared the results of the 2015 screening (presented later in this chapter) with the teachers. They also put forward their ideas about what activities would be important to include in the intervention to address the challenges identified in the 2015 screening. The teachers were invited to contribute by making further suggestions or changes to the proposed activities. In this way the teachers were able to gain a sense of the occupational therapy principles guiding the focus and selection of activities. In turn the students drew on the expertise of the teachers in relation to the various educational strategies, and the principles they were using to teach handwriting. These were then integrated into the intervention. The teachers and occupational therapy students engaged in this way until a complete template of the intervention, with specific instructions guiding the implementation, was put in place. This collaborative approach facilitated the sustainability of the intervention in that the teachers could continue to implement the intervention when students were not present at the practice learning site. Engaging with teachers in this way aligns with best practice models for handwriting intervention in schools (Case-Smith et al. 2014). These measures also align with the Education White Paper 6 (DoE 2001), which encourages partnerships between therapists and teachers to increase the interface of therapy services in the classroom context, and encourages closer links between the occupational therapy inputs and the curriculum goals.

Play, which is the primary occupation of a child, was central to the revision of the intervention. It was recognised that play is how most children learn best, so it was used at Intshayelelo Primary to achieve the intervention goals (Case-Smith & O’Brien 2015). The four elements of playfulness described by Skard and Bundy (2008) – intrinsic motivation, internal locus of control, framing, and suspension of reality – were documented during observations of the Grade R learners engaging in play. The students observed the play engagement of the learners during break times to determine which play activities held the learners’ interest. It was observed that the learners enjoyed group, movement-based play activities, where an element of make-believe was included, and goals were set for them to achieve. These activities were incorporated into the intervention. For example, one classroom intervention session included a game of chalk hopscotch. In pairs one learner would trace a letter or number on the back of their paired learner. That learner would then be challenged to hop a set sequence of steps and then form that letter or number in the block in which they landed.

All of the above shifts were incorporated into the intervention. The DTVMI screening process took place again in 2015, and the results were once again drawn on to determine the specific focus of the intervention to address VMI, VP and MC. The process by which this data was included is described below.
Table 12.1 Results of the DTVMI components for the 2015 Grade R learners

<table>
<thead>
<tr>
<th></th>
<th>VMI Percentile rank</th>
<th>VP Supplemental Test Percentile rank</th>
<th>MC Supplemental Test Percentile rank</th>
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<tbody>
<tr>
<td>Total sample</td>
<td>23rd</td>
<td>5th</td>
<td>21st</td>
</tr>
<tr>
<td>(n=64)</td>
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</tbody>
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Source: Compiled by the authors

Of the possible 118 Grade R learners attending Intshayelelo Primary in 2015, a convenience sample of N=64 learners – all of whose caregivers had provided informed consent – were screened using the DTVMI. This sample included both boys and girls. The mean age of the sample was five years and six months. The mean standard scores for the total sample for each section fell between 75.42 and 88.68 (Table 12.2). This indicated that most learners scored in the low and low average ranges, with percentile ranks ranging from the 5th to the 23rd percentile.

The distribution of standard scores for each component of the DTVMI, that is VMI, VP and MC, were also established for each learner in the sample and are reflected in Table 12.2.

In the VMI section of the DTVMI test the standard scores fell between 58 and 114. For VMI, 67% of the learners scored in the average range (83–117). In the VP supplemental test the learners obtained standard scores of between 45 and 120. This distribution of scores was more skewed towards the lower scores, with the majority of the learners falling into the very low and low range (standard scores between 68 and 82). Further assessment of visual acuity of the learners was recommended in light of their performance in VP. In the MC supplemental test the learners obtained standard scores of between 16 and 114. The distribution of the scores was skewed

Table 12.2 Distribution of the standard scores on all the tests of the DTVMI

<table>
<thead>
<tr>
<th>Standard score range and descriptor</th>
<th>VMI n=64</th>
<th>VP n=64</th>
<th>MC n=64</th>
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<tbody>
<tr>
<td>40–67 Very Low</td>
<td>5</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>68–82 Low</td>
<td>16</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>83–117 Average</td>
<td>43 (67%)</td>
<td>20</td>
<td>48 (75%)</td>
</tr>
<tr>
<td>118–132 High</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
</tbody>
</table>

Source: Compiled by the authors
to the higher scores with 75% of the sample falling into the average range. The above scores correlated with the results of studies exploring the VMI, VP and MC performance of representative samples of Foundation Phase children living in South Africa (Rens 2008; Visser et al. 2017).

The DTVMI performance data presented above in Tables 12.1 and 12.2 highlighted the need for the intervention to account for, and build on, the very low to low average performance of the sample in VMI, VP and MC performance component skills. Best-practice approaches support the use of an eclectic combination of biomechanical, sensorimotor and acquisitional approaches to address handwriting performance (Case-Smith et al. 2014; Van der Merwe et al. 2011b). Principles arising from these approaches guided the intervention. A sensorimotor approach was drawn on through the inclusion of various sensory inputs (tactile, kinaesthetic and auditory) to build on the learners’ integration of visual inputs to output a correct motor response. In line with this approach, activities in the intervention focused on building the body awareness of the learners. This was done through a series of movement-based activities that improve the learners’ understanding of their own body position in space. Becoming aware of, and confident in, the movements of one’s body in space aids the reception and integration of visual information (Case-Smith et al. 2014).

Examples of the activities used to build on body awareness included body songs (Simon says), obstacle courses focusing on balance and jumping, and hopscotch. These movement activities also included a biomechanical approach, which had the additional benefit of building on the learners’ core and postural stability. These are key components that prepare learners to sustain a comfortable position while drawing and writing seated at a desk. Following building on the learners’ awareness of the position of and movement of their body in space, intervention activities were carefully graded. These progressed from the above-mentioned kinaesthetic large body awareness movements to kinaesthetic activities designed to help the learners embed the motor engram of the plan formation, i.e. the physical motions the learner must perform to create each shape, letter and number.

Examples of activities used to build on the learners’ kinaesthetic awareness of shape, letter and number included using various mediums such as finger paint, sand and water trays to help build learners’ understanding of the engram of each shape, letter and number. Using these mediums learners would be encouraged to trace over shapes, letters and numbers while saying or singing a verse of song aiming to build on their visual and motor memory for that specific shape, letter or number. Following this a three-dimensional approach was adopted in which learners worked with materials such as playdough, beads and blocks to build three-dimensional representations of each letter, shape and number.

Finally, as a last progression, the activities adopted a two-dimensional approach with learners now having an opportunity to practice writing the letter, shape and number using writing instruments such as chalk, crayons and pencils. These
materials were graded from larger to smaller instruments. Shapes, letters and numbers were introduced in a sequential manner with vertical and horizontal lines preceding diagonal and circular lines. Opportunities for repetition and practising the formation of the various shapes, letters and numbers were incorporated as part of the acquisitional approach.

**Critiquing and rethinking the practice approach**

The example presented above represents notable shifts from the intervention approaches that have been traditionally adopted in occupational therapy practice in schools. These shifts included:

- drawing more extensively on DTVMI assessment data as evidence to establish the focus of the intervention;
- attending to assessing aspects of playfulness and drawing on the elements of playfulness to support the learners’ engagement in the handwriting intervention; and finally
- drawing more extensively on the inputs of teachers to gain insights into the curriculum, interface themes from the curriculum into the intervention, and draw on the teachers as partners in the design of and implementation of the intervention.

In reflecting further on implementation of this intervention and the insights generated in this process, the following critical considerations are put forward.

Despite shifts, the persistent performance orientation of the intervention remained. Achievement in handwriting was the predominant focus of the intervention. This orientation reflects the dominant hegemonies existent in occupational therapy practice for children. It is also a dominant hegemony in school contexts where learners’ measure of success in learning is measured by their achievement with curriculum expectations (Chapter 8, Peters & Galvaan). Performance in childhood occupations remains the key focus of occupational therapy interventions. It is the practice approach that is revered – and it is the practice approach that often remains unchallenged. The benefits and positive impacts of a performance-orientated approach should not be ignored, but the continued application of this approach without due consideration of the contextually situated nature of occupation – inclusive of the broader aspects linked to engaging in occupations – should be challenged. Galvaan et al. (2015a; 2015b) call for a more contextualised perspective of occupation that focuses on the various contextual factors that shape the emphasis that is placed on certain occupations, and the ways in which the occupations take place in context.

They refer to a more critical approach to occupational therapy practice that draws on the use of the ObCD framework to address the learning challenges of learners attending under-resourced schools (Chapter 8, Peters & Galvaan). ObCD offers ways in which to critique the relevance of the established theoretical underpinnings informing occupational therapy practice for children in schools.
In conclusion, readers are encouraged to explore the ObCD framework, and consider how the approaches embedded in the framework could serve as a means to consider the broader contextual factors impacting on the learning occupations, such as handwriting, for children attending under-resourced schools. Various questions are presented to prompt consideration of these contextual factors:

- Beyond the intrinsic performance components, what other factors may contribute to and/or limit the participation and engagement of learners in the occupation of handwriting?
- What broader contextual factors could be contributing to difficulties with the engagement in, and performance of, handwriting occupations?
- Should handwriting remain the key learning occupation that builds on the literacy of learners? What are the alternative ways of allowing learners to express their ideas?
- What are the multiple forms of engagement that could build on the literacy of learners and allow them to express their ideas in alternative ways?

Notes
1 In this chapter the use of the term ‘occupation’ is intentional and refers to the learning occupations which children engage in during the foundational school years. This includes the occupations of handwriting, reading, comprehensions, mathematical and life skills.
2 SHAWCO is a student volunteer organisation at the University of Cape Town.

References


