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Increasing Reading Comprehension and Accuracy by Enhancing Reading Mechanics in Preadolescence: The Role of Occupational Therapy in Academia

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Introduction

- 16-week capstone project was conducted at the **Huntsville Learning Center (HLC)**, a nonprofit organization in Huntsville, Alabama.
- HLC focuses on academic support, personal growth, and character development.
- Capstone purpose was to **develop a program** that would promote reading comprehension and accuracy, emotional regulation skills, and access to resources required for academic success.
- Reading comprehension and accuracy** would be increased by enhancing reading mechanics through engagement in **occupation-based activities**.



"HLC believes that every child deserves a chance to succeed, regardless of their background or circumstances."

(hsvlc.org, 2024)

Figure 1. Huntsville Learning Center. (2024). HLC Logo. https://www.hsvlc.org/

Capstone Site Description

- HLC is a faith-based program helping students from impoverished and underserved communities through a holistic approach by providing academic and spiritual support.
- Children served by the HLC often come from low socioeconomic status (SES) backgrounds.
- Capstone project focused on the **Christian Summer Camp**, serving twenty-eight 3rd-5th grade students, meeting 8 hours a day, Monday through Thursday.
- Camp offers daily opportunities to excel in Bible knowledge, language arts, math, team-building, character development, and physical fitness.



Figure 2. Behel, S. (2024). Huntsville Learning Center Summer Camp [Photograph].

Summary of Needs Assessment

- National Assessment of Educational Progress (NAEP, 2022) found a substantial number of fourth-grade students in the United States are reading **below satisfactory levels**.
- Based on semi-structured staff interviews, the previous summer camp program lacked a structured reading curriculum.
- Staff administrators expressed great interest in integrating **multi-sensory reading activities** that align with Christian teachings into the summer camp program.
- Based on literature review, there is limited research on the effectiveness of structured reading programs in faith-based summer camps.
- Research shows that there is limited integration of sensory and motor-based interventions, which have shown promise in supporting reading development.

Literature Review Summary

- Reading comprehension and accuracy** are fundamental skills that influence **academic success** and lifelong learning. At the fourth-grade level, students should be transitioning from stage 2 (learning to read) to stage 3 (reading to learn). However, based on the reading scores from the NAEP, a significant number of fourth-grade students have not transitioned and are continuing to learn how to read (Chall, 1983; Hudson et al., 2020; NAEP, 2022).
- Mechanics of reading** encompass a variety of foundational skills (visual tracking, letter recognition, working memory) and processes that enable a person to decode, interpret, and comprehend written text effectively. When these skills are not well-developed, they can hinder the overall reading process.
- Enhancing reading mechanics through fundamental processes like **eye movement control, visual motor integration, and orthographic processing** can significantly **improve reading comprehension and accuracy** (Hudson et al., 2009).

Impact on Reading Comprehension and Accuracy

- Students who engaged in **structured reading activities** that incorporated **eye movement and visual-motor skills** training showed marked improvements in reading comprehension and accuracy (Fongpaiboon and Porkaew, 2018).
- Reciprocal teaching** significantly improved reading comprehension and fluency, particularly among students with learning difficulties (Juhkam et al., 2023).

Occupational Therapy Interventions

- A 12-week study investigating the effect of a perceptual-motor intervention aimed to integrate information from various senses by engaging in proprioceptive stimulation enhanced letter recognition and formation by incorporating letters and shapes into gross motor activities (Botha and Africa, 2020).
- Results demonstrated a significant improvement in motor proficiency and overall letter knowledge.



Figure 3. Behel, S. (2024). Huntsville Learning Center Summer Camp [Photograph].

Capstone Project Description & Outcomes

Preparation

- Collaborated with educators and determined program expectations to develop occupation-based learning and reading activities.
- Prepared DIBELS testing materials for each child at camp based on grade level.
- Met with reading specialist at Huntsville City Schools to be trained on the administration and scoring of DIBELS assessments.

Implementation

- Administered DIBELS pretest assessments to the children during the first week of camp and post-test assessments during the last week of camp.
- Implemented occupation-based reading activities to enhance reading mechanics (i.e. flashlight words: visual scanning, word recognition, comprehension, working memory, visual-motor skills).
- Incorporated occupation-based activities into multiple camp activities (i.e. gardening, recess, lunch, Bible studies)

Analysis

- Compared initial DIBELS scores to scores at 4 weeks. (Comparison typically takes place at 4 months)
- ORF: $t(25)=-6.077, p<0.001$ Maze: $t(25)=-3.926, p=0.005$
- Post-program evaluation survey of parents, students, and staff.

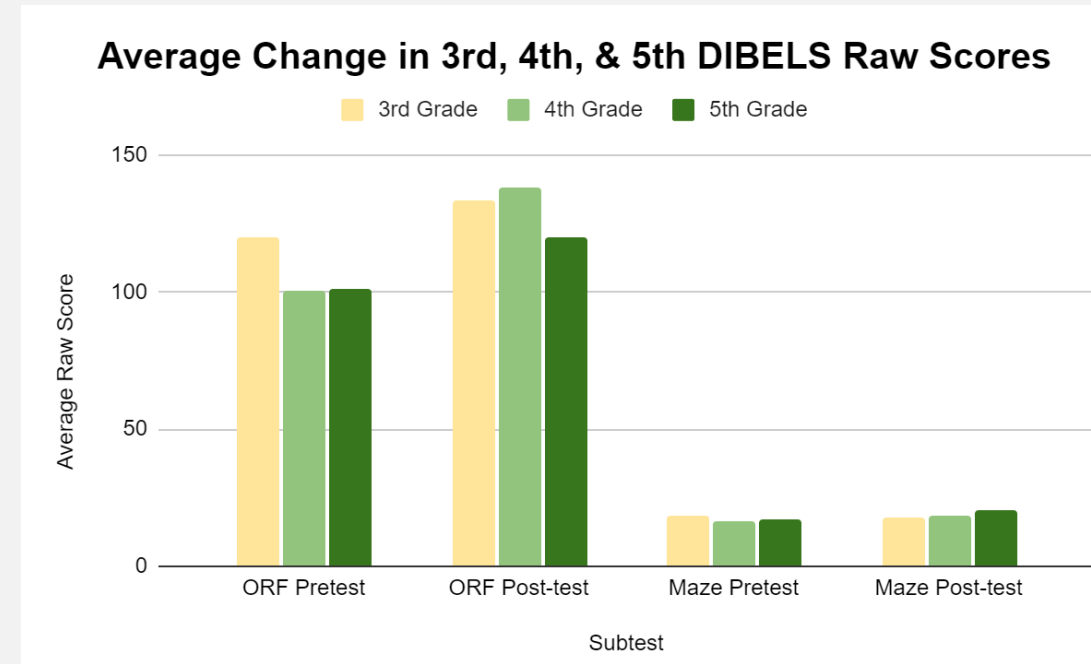


Figure 4. Note. Average change in raw scores of 3rd, 4th, and 5th-grade students are compared between pretest and post-test measurements.

Sustainability

- Adapted ALERT program binder left for future staff use.
- Created an occupation-based activities binder for staff.
- Provided parent brochure for home-based learning activities.

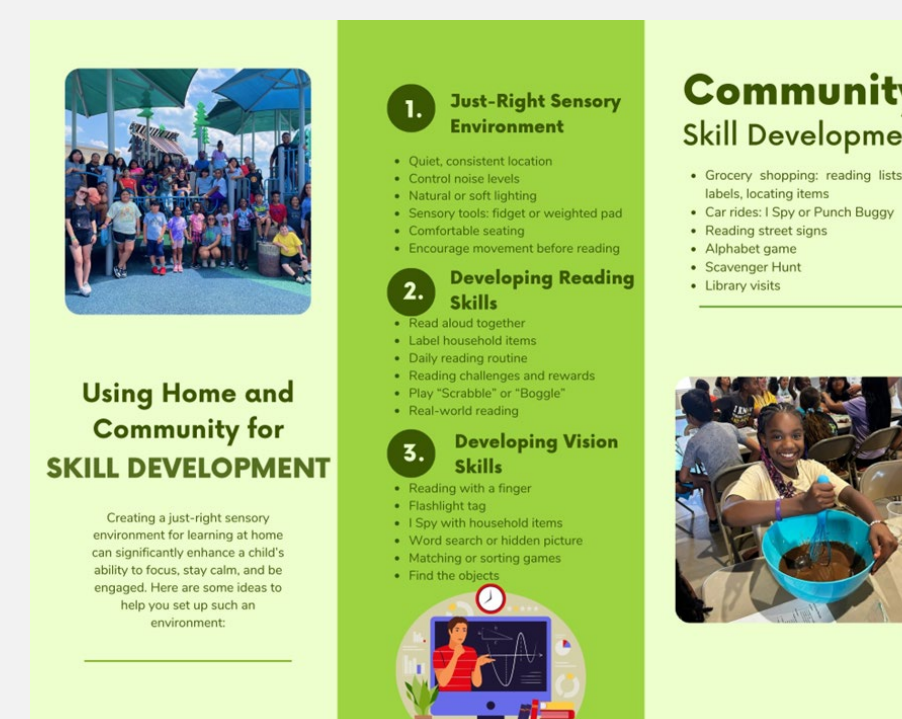


Figure 5. Behel, S. (2024). Brochure for HLC Summer Camp parent training [Brochure].

Capstone Goals Achieved

- Administered DIBELS assessments to obtain pretest and post-test measurements for reading comprehension, fluency, and accuracy.
- Designed and facilitated occupation-based reading activities to enhance reading mechanics.
- Developed a manual of occupational-based activities and ALERT program handouts for staff members (Williams & Shellenberger, 1996)
- Developed a brochure and conducted parent training on how to create an effective learning environment through sensory experiences at home.
- Analyzed pretest and post-test data to determine program effectiveness.



Figure 6. Behel, S. (2024). Adapted ALERT movement strategies [Infographic].

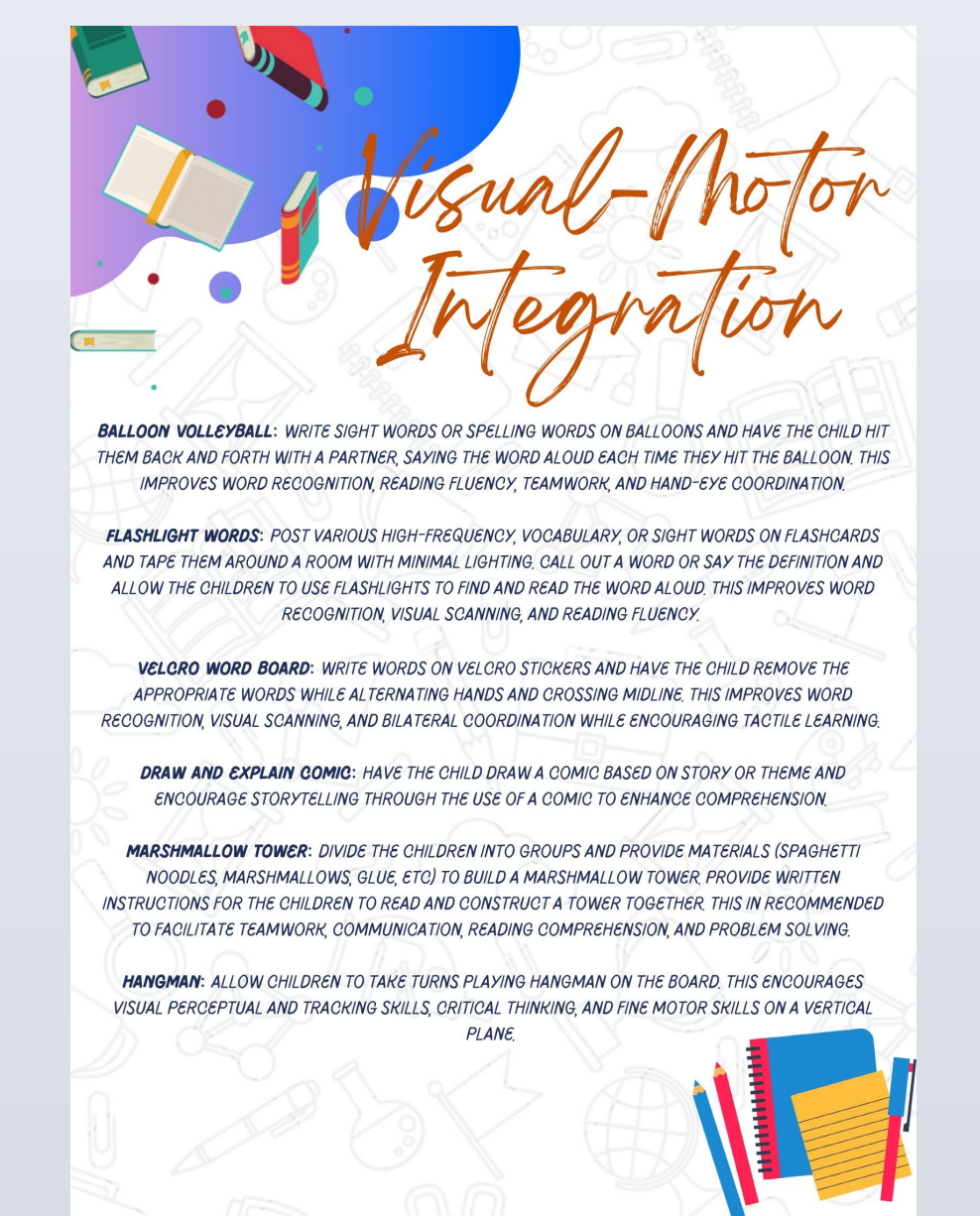


Figure 7. Behel, S. (2024). VMI occupation-based activities [Infographic].



Figure 8. Behel, S. (2024). Huntsville Learning Center Summer Camp [Photograph].

Implications for OT Practice

- Occupational therapists should consider using multi-model sensory-infused occupation-based interventions to support educators and parents in promoting improved reading skills.
- Occupational therapists can promote reading skills in school-based practice, after-school, and community settings.
- Occupational therapists should familiarize themselves with reading programs and assessments.
- Collaboration with elementary school teachers, reading specialists, and parents can improve reading skills.

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References Available Upon Request