Variations in Second-Grade Students’ Number System Knowledge Outcomes

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Introduction

Number system knowledge (NSK) is the ability to relate quantities to their respective symbolic representations, understand relations among those numbers, and use that knowledge to manipulate quantities through operations.

• NSK is a predictor of adolescent functional numeracy (Geary et al., 2013).
• Weakness in symbolic number knowledge is an area for further research.
• Current research focuses on preschool and kindergarten instructional interventions (e.g., Jordan et al. 2012), hence research in primary elementary grades is warranted.

As part of a larger study, this analysis focuses on the quantitative data to answer a broad research question: What are the variations in students’ Number System Knowledge outcomes after they participate in the instructional treatment?

Methods

The participants were 75 students from 5 different second-grade classrooms. From those classrooms, 11 students were selected as cases for an in-depth analysis.

Results

The paired-samples t test results showed a significant difference from pretest to posttest, t(74) = 18.21, p < .001 with a large effect size of 2.10.

Table 1 shows descriptive statistics on pretest and posttest scores by class.

<table>
<thead>
<tr>
<th>Class</th>
<th>NSK Pretest</th>
<th>NSK Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>34</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>44</td>
<td>71</td>
</tr>
<tr>
<td>3</td>
<td>43</td>
<td>64</td>
</tr>
<tr>
<td>4</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>68</td>
</tr>
</tbody>
</table>

An in-depth analysis of case students’ pretest and posttest scores is currently being conducted along with a qualitative analysis.

Figure 1 – All Participants’ Scores After Treatment

Students made significant growth in their NSK learning outcomes. However, we cannot parse out what factors caused this growth. Our next step is to analyze the qualitative data to better understand how and why learning occurred. The goal of our results is to help improve instructional methods for developing number sense.

Figure 2 – Visual Analysis by Class and Case

This study was conducted with funding from our mentor’s USU Grant-Writing Through Mentorship grant from the Office of Research and Graduate Studies.

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