

## **Improving Mathematics Fluency**

### **Abstract**

Students with specific learning disabilities struggle with mathematics fluency. The purpose of this study is to explore whether specialized, direct instruction of mathematics fluency drills and the structured, consistent use of an online mathematics fluency program will improve the addition and subtraction fluency of a primary student in special education.

### **Statement of the Problem**

Many students in special education are struggling with their everyday academics. These students receive special education services in various settings, ranging from inclusive classrooms to resource rooms. About 2.3 million children had a specific learning disability in 2012 (Synder & Dillow, 2015). Some of these students have an impairment in mathematics. According to the new Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5), a specific learning disorder with impairment in mathematics includes “possible deficits in number sense, memorization of arithmetic facts, accurate or fluent calculation, and accurate math reasoning” (American Psychiatric Association, 2013, p 265).

Some of these students are diagnosed with an alternative term titled dyscalculia. Students with dyscalculia may not be able to understand basic addition and subtraction mathematics operations. These students are often taught using manipulatives. During regular classroom instruction, the students are allowed to use a number line, counter chips, or a hundreds chart to count. However, on state standardized tests, these students are not allowed to use these manipulatives. Many students begin to hate mathematics because of their weaknesses in the subject area. It becomes increasingly difficult for them to master the standards. As a result, they may choose to avoid the subject. In order to avoid this, special and general education teachers

need to become proactive and individualized instruction for students with dyscalculia. Teachers should be analyzing their students' weaknesses and improving these areas using specialized instruction.

### **Purpose and Research Question**

The purpose of this study is to explore whether specialized, direct instruction of mathematics fluency drills and the structured, consistent use of an online mathematics fluency program will improve the addition and subtraction fluency of a primary student in special education.

The following research question will be investigated: How does the combination of specialized direct instruction of mathematics fluency drills and structured consistent use of an online mathematics fluency program affect the addition and subtraction fluency skills of a second grade student with a Specific Learning Disability?

### **Literature Review**

Many research studies have investigated topics surrounding students with disabilities and different ways to understand and improve mathematical skills and fluency. It is important for educators to understand their students' disabilities, and find a fun and creative way to improve students' math skills. Research has shown that students can improve their mathematic fluency skills with proper intervention.

Ketterlin-Geller, Chard, and Fien (2008) examined two mathematical interventions on low performing students in elementary school. The results indicated that both interventions were successful in generating positive results for the students in the study. This study included students with disabilities. Out of the 51 students in the study, 15 students received special education services. Ketterlin-Geller et al. (2008) stated that it was possible that only students in

special education might benefit from these interventions. Ketterlin-Geller et al. (2008) also stated that they might not have correctly aligned the students' educational needs, based on their weaknesses, with the goals of the specified interventions.

Different tutoring programs are being used to improve mathematic skills among students. Fuchs, Seethaler, Powell, Hamlett, and Fletcher (2008) assessed the effects of preventative tutoring on the mathematic problem solving. The participants for the study were chosen based on low performance in mathematics and reading. The authors decided to do this because, based on prior research, deficits in both mathematics and reading are "likely to produce severe academic deficits that are especially difficult to remediate" (Fuchs, Seethaler, Powell, Hamlett, & Fletcher, 2008, p 160). The results did show that the participants improved mathematic word problem skills with the tutoring program. The authors were not able to comment whether the tutoring program they studied is more effective than other preventative tutoring programs. Future studies have to be conducted to compare and contrast tutoring programs and protocols.

This literature review supports the present action research study, which is going to explore mathematics fluency drills and an online mathematics fluency program. Although many studies were conducted surrounding the topic of mathematics, few studies focus specifically on mathematical fluency skills within addition and subtraction with students with disabilities. The literature review also revealed that very few researchers used students with disabilities as their only participants. Once students feel comfortable and confident with math fluency, their self-esteem in mathematics may improve. This may be achieved by targeting student weaknesses through specialized instruction.

### **Research Methodology**

The action research will be conducted in an elementary private school in Miami, Florida. The participant in the study will be a second grade student. The student is male. He has a specific learning disability in mathematics. The special education teacher will be responsible for providing direct mathematics fluency instruction to the student, monitoring the online mathematics fluency program, collecting data, and graphing results.

Data will be collected on the following: pre and posttest scores based on an addition and subtraction basic facts assessment, scores from a weekly addition and subtraction fluency check, and student attitude and ownership based on responses from checklist. Data will be analyzed using a bar graph, line graph, and data table.

### **Findings**

Research findings will be available in time for the conference and will be presented. An increase in the student's addition and subtraction fluency skills is expected. Data collection and analysis will begin the first week of January and will conclude the first week of March.

### **Implications**

Students with disabilities in mathematics struggle with addition and subtraction fluency. This research study is going to provide specialized direct instruction of mathematics fluency drills and structured consistent use of an online mathematics fluency program in order to improve fluency skills. If the study shows positive results, teachers can use these interventions with their students with specific learning disabilities in mathematics.

### **References**

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