

Chapter 13

Characteristics and Instructional Strategies for Students With Mathematical Difficulties: In the Inclusive Classroom

Kathleen Hughes Pfannenstiel

American Institutes for Research, USA

Jennifer “JC” Sanders

Independent Researcher, USA

ABSTRACT

This chapter explores mathematics education for students with mathematical difficulties (MD) and disabilities. Academic achievement measures have remained stagnant for this student population over the past 20 years (NAEP, 2013). The authors highlight Multi-Tiered System of Support and evidence-based strategies as a means to address the unique needs of students with disabilities within inclusion and general education contexts. Common characteristics of students with MD are challenges with working memory, number sense, symbols, basic fact computational fluency, word problem solving, and self-regulation. Educators can apply these specific recommendations to enhance mathematics instruction to address the critical factors for academic success for all students, but specifically students in special education or with MD. In order to implement these evidence-based strategies and ensure specially designed instruction is being provided, co-teaching models are reviewed as one way to provide instructional support in an inclusive setting.

INTRODUCTION

According to the National Center of Education Statistics (2011), 61% of students with disabilities are primarily served in the general education classroom 80% of the school day. Two pieces of educational legislation encourage students with disabilities to be served in the general education classroom;

DOI: 10.4018/978-1-7998-1213-5.ch013

Characteristics and Instructional Strategies for Students With Mathematical Difficulties

Individuals with Disabilities Education Act (IDEA) and Every Student Succeeds Act (ESSA, 2015) which reauthorized Elementary and Secondary Education Act (ESEA). IDEA states that students in special education need to be served in the least restrictive environment (LRE), which is often the general education classroom. In addition to LRE considerations, ESSA along with IDEA, states that all students, regardless of special education placement, are given state mandated assessments to measure progress on grade level standards/objectives. ESSA also stresses that students must demonstrate mastery and be exposed to grade level material and evidence-based instructional practices. Often, the best placement for exposure to grade level standards is within the general education classroom, rather than a separate resource or pullout classroom specifically for students in special education (e.g., resource room). While exposure to general core curriculum is necessary, students in special education often require specialized instruction in addition to core curriculum in order to gain mastery of grade level material. It is essential that special educators understand foundational mathematic skills and progressions to identify skill deficits and implement specialized instruction while accessing grade level material.

On a national level, mathematics continues to be an area that many students, not just those in special education, score lower in as compared to reading. In 2008, the U.S. Department of Education, National Mathematics Advisory Panel (NMAP), released a report describing the mathematical weaknesses of today's students. NMAP highlighted the high percentage of students lacking proficiency in such prerequisite skills as fractions or algebra by 12th grade, leading to an increased need for remedial mathematics classes in postsecondary settings. The National Assessment of Educational Progress (NAEP, 2015) reports that since 1990 mathematics scores have increased 28 points in Grade 4 and 22 points in Grade 8, but recent NAEP scores have remained virtually consistent from 2011-2013 and since 1990 have only seen a 15-point increase. In examining 2015 results, students in fourth and eighth grade scored lower or remained consistent with 2013 results. In fourth grade there was a score decrease for female, white students. In eighth grade score decreases were seen in male, black, Hispanic, students receiving free or reduced lunch and students with disabilities. In addition, the percentage of students scoring at or above proficient is also lower than 2013. As a nation, these results are alarming. Students, regardless of race, ethnicity, special education, or SES level are struggling with basic mathematical skills.

The disparity between students with disabilities and those without is discouraging and mathematics continues to be an area of struggle for students receiving special education support. Mathematics is not simply the computation of numbers; it involves reading, self-regulation skills, multi-step problem solving, vocabulary, and generalizations across topics. In addition, mastery of vital prerequisite skills is essential for higher level mathematics classes, which can be hindered by the complex demands of mathematics. As a result of the complexity, it is imperative that special educators have a conceptual understanding of mathematics and the trajectory of skills to best serve students within the inclusive mathematics classroom.

Having an understanding of characteristics of students with mathematical difficulties (MD) is important in identifying and breaking down specific skill deficits in order to remediate or pre-teach for success. Following an understanding of gaps in skills, the next step is to develop knowledge of evidence-based practices (EBPs) for specialized instruction of students receiving special education services, as well as those with mathematics difficulties as part of a Multi-Tiered System of Support (MTSS) in the general education inclusive setting.

The objectives and purpose of this chapter is to link EBPs in mathematics with evidence-based special education practice for special educators, interventionist, and small group differentiated instruction by a general educator. This chapter will present strategies linked to skills necessary for long-term success in mathematics: vocabulary instruction, word problem solving, arithmetic facts, and self-regulation

30 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/characteristics-and-instructional-strategies-for-students-with-mathematical-difficulties/240982

Related Content

Visual Representation of Whiteness in Beginning Level German Textbooks

Silja Weber (2017). *International Journal of Bias, Identity and Diversities in Education* (pp. 1-12).

www.irma-international.org/article/visual-representation-of-whiteness-in-beginning-level-german-textbooks/182849

Multilingualism, Identities and Language Hegemony: A Case Study of Five Ethnic Minority Students in China

Jing Liand Danièle Moore (2017). *International Journal of Bias, Identity and Diversities in Education* (pp. 42-56).

www.irma-international.org/article/multilingualism-identities-and-language-hegemony/182852

Transformative Learning: Positive Identity Through Prison-Based Higher Education in England and Wales

Anne Pikeand Susan Hopkins (2019). *International Journal of Bias, Identity and Diversities in Education* (pp. 48-65).

www.irma-international.org/article/transformative-learning/216373

Enhancing the Internationalization of HBCUs

(2025). *Enhancing Outcomes and Shaping the Future of HBCUs* (pp. 241-296).

www.irma-international.org/chapter/enhancing-the-internationalization-of-hbcus/359695

Gender-based Preferences and the Hybrid Workplace: The Practitioners' View From India

Aparna Devagiri (2022). *Global Perspectives on Maintaining Gender, Age, and Religious Diversity in the Workplace* (pp. 217-237).

www.irma-international.org/chapter/gender-based-preferences-and-the-hybrid-workplace/312391