

Teacher Preparation for Teaching Mathematics to Students with Disabilities

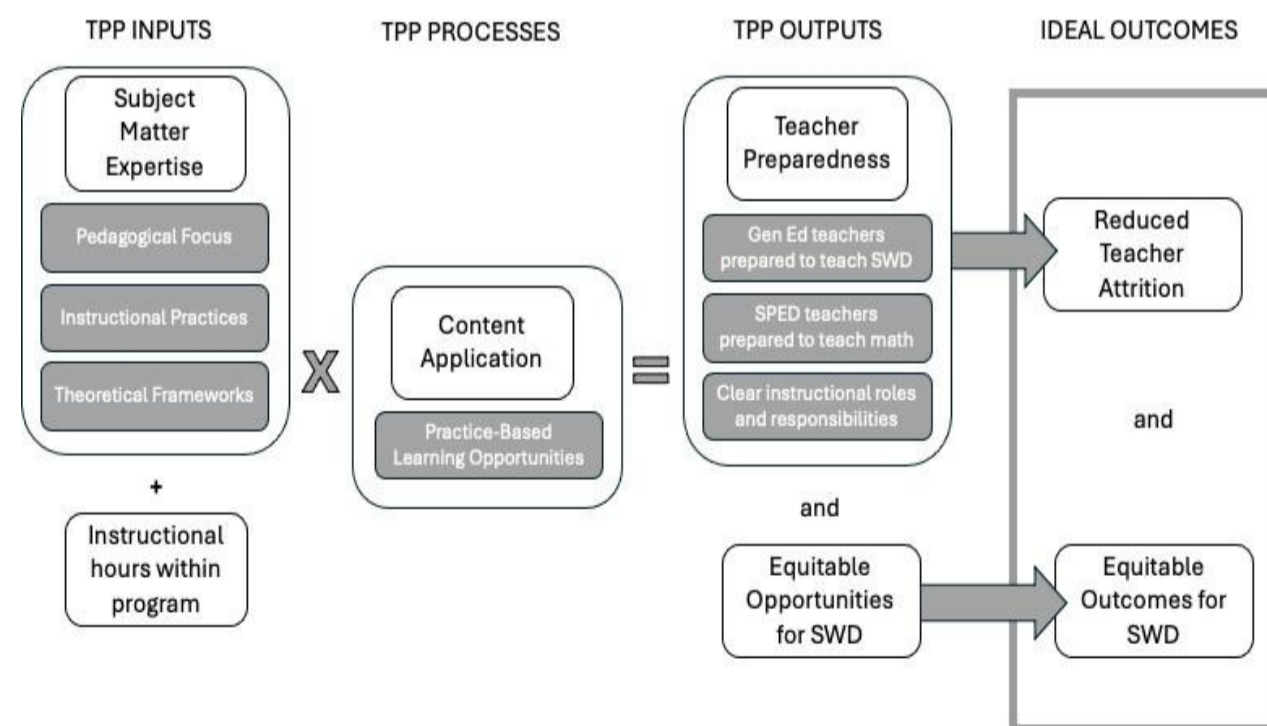
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Abstract

Skills related to mathematics are important concepts for all people to understand, including individuals with disabilities. Despite the importance of mathematics, special education teachers report feeling unprepared to teach mathematics and general education teachers report feeling unprepared to teach students with disabilities, despite the fact the majority students with disabilities receive instruction in general education classrooms. The primary goal of this nationwide survey is to elicit the opinions of subject matter experts (SMEs) to see what practices and approaches, including course hours and practice-based learning opportunities are recommended when preparing preservice teachers and what practices and approaches are happening within Institutions of Higher Education. The responses of general education and special education faculty who are preparing preservice were compared to see what differences exist between their perceptions of instructional responsibilities, teaching practices, and practice-based learning opportunities that are provided.

Introduction

This research examines faculty beliefs, instructional practices, and perceived levels of preparedness for teaching mathematics to students with disabilities. Teacher preparation programs aim to equip future educators with the skills necessary to meet the diverse needs of students.



The study explores four questions:

1. Do general education and special education faculty differ in their beliefs about instructional responsibilities?
2. Do they prioritize What Works Clearinghouse (WWC) recommendations differently when preparing preservice teachers?
3. Are there differences in recommendations for practice-based learning opportunities?
4. How do perceived levels of preparedness vary among special education, general education, and dual certification teacher candidates?

Results

Of the 69 survey responses, 24 met inclusion criteria (n=24). 7 respondents were SMEs in general education mathematics, 15 were special education SMEs, and 2 had a dual focus.

RQ1: Statistical Test: Independent T-Tests

Special education SME had a stronger belief that they have greater responsibility for preparing preservice teachers to teach mathematics at their IHEs (M = 3.730, SD = 1.100) than did general education SMEs (M = 1.860, SD = 1.070), a statistically significant difference, M = -3.758, 95% CI [- 2.918, -.835], t(20) = -3.758, p = .001.

RQ 2: Statistical Test: Mann Whitney U Tests

Special education SMEs and General Education SMEs were asked to rank each of the following What Works Clearinghouse Practices as "Essential", "Important", or "Not Necessary":

- Deliberate word problem instruction
- Provide systematic instruction during intervention
- Regularly used timed activities as a way to build fluency
- Teach clear and precise mathematical language
- Use number lines to facilitate the learning of mathematical concepts and procedures
- Use well-chosen sets of concrete and semi-concrete manipulatives

For general education preservice teachers, there were no statistically significant differences in SME recommendations. For special education preservice teachers, "use number lines..." was the only statistically significant finding:

U=28.0, z= -2.107, p=.035 mean rank Gen Ed= 15.00 mean rank SPED= 9.87

RQ 3: Statistical Test: Fisher's Exact Test

SMEs ranked 14 practice-based opportunities as "Necessary" or "Not Necessary", including course-based instruction, coaching, co-teaching, classroom observations, clinical experiences, practicums, student teaching, lesson study, microteaching, reflective journaling, mixed reality simulations, peer coaching, tutoring, and video analysis (self/others). Significant results are shown below:

Practice Based Learning Opportunity	Gen Ed SME Recommend Yes		SPED SME Recommend Yes		p-value Fisher's
	n	%	n	%	
Coaching for SPED	3	42.9	14	93.3	.021
Field based: classrooms observations for SPED	3	42.9	15	100.0	.005
Field based: clinical experiences for SPED	3	42.9	15	100.0	.005
Field based: practicums for SPED	3	42.9	15	100.0	.005
Field based: student teaching for SPED	3	42.9	15	100.0	.005
Lesson Study for SPED	2	28.6	12	80.0	.032
Micro-teaching for SPED (direct instruction on a specific skill)	2	28.6	13	86.7	.014
Video Analysis for SPED (reviewing own teaching)	2	28.6	14	93.3	.004

Result 4: Statistical Test: Mann Whitney U-Test

Regarding preparation, the only statistically significant difference in general education and special education SME perceptions was regarding the preparedness of general education preservice teachers to teach mathematics to students with disabilities. Special education SME rated the preservice teachers as less prepared than general education SMEs.

General education preparation to teach mathematics to students with disabilities. U=24.50, z= -2.041, p=.041 mean rank Gen Ed= 14.50 mean rank SPED= 9.25

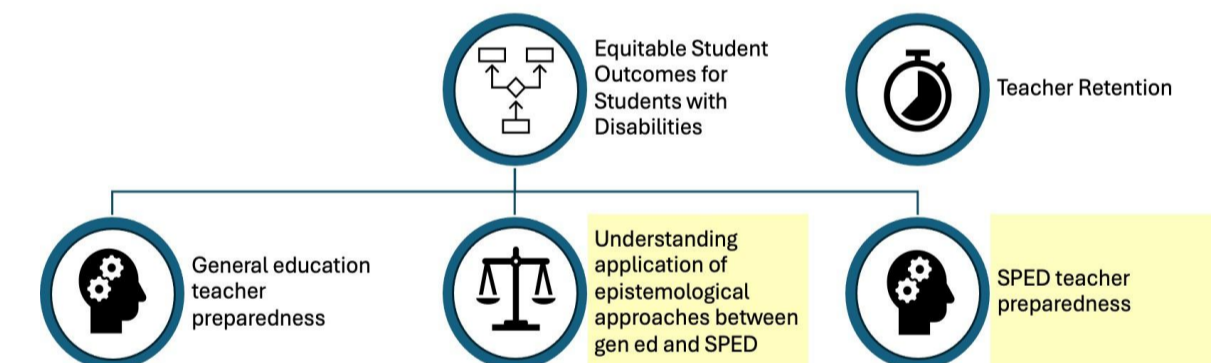
Methods

A quantitative, non-experimental survey was used. Participants met the following criteria: (a) those currently teaching, or who have taught special education or elementary math courses to preservice teachers (PSTs) within the last five years, (b) least one year of experience preparing PSTs, and (c) those who teach in teacher certification programs. The survey focused on instructional course hours, instructional practices, PST preparedness, and practice-based learning opportunities.

Recruitment Process

- snowball sampling through social media and word of mouth
- systematic sampling by emailing every fifth accredited college and university across all fifty states.
- purposive sampling based on expertise and geographic region, specifically targeting presenters from the DADD 2025, CEC 2025, NCTM 2024 and TED 2024 conferences.

Broader Implications



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