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Centering Equity in Teacher Education: Critical Inquiry Groups in the Preservice Context

By

Allison Rose Firestone

A dissertation submitted in partial satisfaction of the  
requirements for the degree of

Joint Doctor of Philosophy  
with San Francisco State University

in

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in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Anne E. Cunningham, Chair  
Professor Mary Requa  
Professor Stephen Hinshaw

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## Abstract

### Centering Equity in Teacher Education: Critical Inquiry Groups in the Preservice Context

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Allison Rose Firestone

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Professor Anne E. Cunningham, Chair

Although inequities are rooted across the educational ecosystem, access to high-quality learning represents a salient inroad for improving marginalized students' educational experiences. However, preparing teachers to enact equity-centered pedagogy—that which renders high-quality learning accessible to all students—remains a multidimensional problem with a dearth of empirically supported solutions. Given special educators' central role in supporting marginalized students' learning, ensuring that special educator preparation supports the development of an equity-centered practice is of particular importance.

Therefore, this study examines Teacher Study Groups (TSGs) as a model for building preservice special educators' practice and, in doing so, examines the underlying processes of preservice learning that result in instructional improvements. My conceptual framework articulated communities of practice theory with empirical research on teacher learning and the conception of *critically inclusive* pedagogy, which cross-pollinates access- (i.e., Universal Design for Learning) and asset-based (e.g., culturally sustaining pedagogy) paradigms.

To understand the underlying processes that preservice teachers' traverse as they build capacity in critically inclusive practices, I studied preservice teachers' participation in a course-embedded TSG. Through a convergent mixed methods design, I examined 60 preservice teachers' instructional quality prior to and following participation, along with their knowledge, attitudes, and knowledge calibration, as well as teaching artifacts and reflections shared during weekly sessions. In alignment with a convergent approach, I first analyzed quantitative and qualitative data separately, and I then integrated data through a joint display analysis to generate meta-inferences. Results indicated that participants significantly improved practice and foregrounded salient participatory experiences that hindered and facilitated participants' professional growth. I conclude with a discussion of implications for equity-centered teacher preparation.

*Keywords:* teacher preparation, critical inclusion, teacher study groups, mixed methods, joint displays

## DEDICATION

This work is dedicated to my mother, a lifelong educator, role model, and childhood trauma survivor who dedicated her career to students who exist outside the normative box. From Day 1, you have continually motivated me to walk my own path with joy and purpose. My opportunity to earn this degree rests on your shoulders, without which I would never have crossed the finish line. This is also dedicated to my former students, the kindergarten through fifth graders whom I had the privilege to teach. They lit the fire in me that continues to burn and fuel my work toward a system that grants all students the educational opportunities to which they are entitled. They taught me about resilience, perseverance, and that it's okay—and often more fun—to do things your own way. Most of all, this work is dedicated to my children—Owen and Mila—and to my husband Bryan. You are my greatest champion and daily inspiration to ask the difficult questions and openly stand against all forms of oppression. Thank you for being passionate about my profession and my success. I would not be the person I am today without your support.

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## CHAPTER I: INTRODUCTION

Although inequities are rooted across the educational ecosystem, access to teachers who can facilitate equitable access to high-quality learning represents a salient inroad for improving marginalized students' educational experiences (Darling-Hammond, 2015; Gregory et al., 2016; Vaughn et al., 2015). However, preparing teachers to enact equity-centered pedagogy—which renders high-quality learning accessible to all students—remains a multidimensional problem with a dearth of empirically supported solutions (Cochran-Smith, 2020; Hammond, 2014; Paris & Alim, 2017). Given special educators' role in supporting marginalized students' learning (i.e., Annamma et al., 2018; Darling-Hammond, 2015), ensuring that special educator preparation supports the development of an equity-centered practice is of particular importance.

Yet in its current state, the field of special education exemplifies educational injustice across a range of metrics (Kozleski, 2020). Outcomes for students placed in the special education system reflect qualitatively different trajectories than non-placed peers, and students' academic and identity labels influence those experiences once placed in the system. On average, students who are Black, Indigenous, or People of Color (BIPOC) are found eligible for special education at higher rates than white peers (Ahrum et al., 2021) and, once placed, are more likely to be taught in segregated settings (Cooc, 2022; Skiba et al., 2006) and face exclusionary punishment (e.g., out-of-school suspensions; Cruz & Rodl, 2018). Distally, students in the special education system are more likely to drop out of school (Thurlow & Johnson, 2011) and be incarcerated (e.g., Bronson et al., 2015), and they are less likely to complete post-secondary education and obtain employment (e.g., Bouck, 2014; Newman et al., 2011). Further, these experiences tend to compound for multiply marginalized students (e.g., BIPOC with dis-abilities;<sup>1</sup> see Annamma et al., 2018; Morris & Perry, 2017). Although the inequalities that function through the special education infrastructure will not be rectified without a large, systemic reckoning (Cruz et al., in press; Ray, 2019), “placing equity front and center” (Nieto, 2000, p.180) in special educator preparation represents one inroad for rectifying entrenched injustices.

However, educator preparation remains fraught with challenges as licensure programs struggle to connect coursework to the realities of teachers' practice. Novice teachers have reported being highly influenced by fieldwork but seeing little connection between those formative experiences and their university courses (Darling-Hammond, 2006; Markelz et al., 2017). Although coursework provides a theoretical foundation for teaching, without supported opportunities to connect knowledge to practice, preservice teachers (PSTs) may struggle to identify situations that require theory-grounded enactment (Kennedy, 1999; 2016). Additionally, the tension between state-mandated coursework requirements and time available commonly result in narrow treatments of equity, often relegated to a single course (Cochran-Smith, 2020; Sleeter, 2012) rather than centered across programming and fieldwork. Singular equity courses struggle to transcend a tenuous connection between theory and the realities of practice, and they have tended to emphasize PSTs' beliefs and attitudes and/or reductive views of culture and context rather than holistic development of an equitable practice in relation to student diversity—broadly conceived—and access to meaningful learning (Andersen & Stillman, 2013; Bennett, 2012; Gorski & Dalton, 2020).

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<sup>1</sup> I use “dis-ability” to indicate “a spectrum or multitude rather than the binary of dis/ability” (Greenstein, 2016, p. 14).

Without a foundational understanding that dis-ability as it is constructed in schools represents an equity issue, novice special educators may inadvertently enact practices that maintain the marginalized status of labeled students (e.g., Bal et al., 2014; Banks, 2017; Lambert & Tan, 2017). As such, new teachers must enter the field adept with:

practices that ensure that every student has access to an education focused on *meaningful learning* (i.e., that teaches the deeper learning skills contemporary society requires in ways that empower students to learn independently), taught by competent and caring educators who are able to attend to the student's social and academic needs. (Noguera et al., 2015, p. 3)

This conception of an equity-centered practice includes the ability to identify and question the ways in which pathologizing student needs (e.g., Cruz et al., 2021; Fish, 2019) and associated deficit perspectives (Bal et al., 2014; Harry et al., 2005; Lambert, 2018; Linton, 2015) lead to harmful educational practices, including implementation of over-simplified curricula (Bannister, 2016; Klehm, 2014) and placement in segregated settings (Cooc, 2022).

However, developing an equity-focused practice is a process rather than a product. Accordingly, teacher preparation must shift from the idea that PSTs can amass requisite knowledge—or learn *for* teaching, in a summative sense—during the preservice period. Rather, programs must build PSTs' capacity to learn *from* their teaching upon entering the field (Hammerness et al., 2005). Providing supported opportunities to engage in reflection is essential in developing a foundation for ongoing professional learning (Cochran-Smith, 2020; Kennedy, 1999; Lampert & Ball, 1999), as development of critical inquiry and collaboration skills requires time, supported practice, and an early start (de Bettencourt & Nagro, 2019; Sims & Walsh, 2009).

## **Literature Review**

### **A Model for Collaborative Inquiry**

Teacher Study Groups (TSGs), a model of practitioner-led learning, have been shown to improve teachers' knowledge, teachers' practice, and students' learning (Firestone et al., 2020). In this collaborative model, communities of educators convene regularly over a sustained period (e.g., every two weeks during an academic school year), engaging in reflective cycles of inquiry focused on the relationship between participants' day-to-day practice and student learning. Whereas other collaborative learning models (e.g., professional learning communities) focus on an unbound, fluid range of topics, a TSG concentrates on a single topic (e.g., emergent literacy; Cunningham et al., 2015) using a pre-planned scope and sequence. This model includes the provision of new content to participants to increase collective knowledge within the community and enhanced structure for connecting knowledge to practice, seeking to overcome the potential for perpetuating inaccurate knowledge and ineffective practices.

The TSG model has been largely implemented with practicing teachers, and the bulk of impact research has occurred in this context. Researchers studying TSGs have employed a variety of methodologies and research designs to examine the model's effect on teachers' knowledge and practice and student outcomes (Firestone et al., 2020). Extant findings have indicated that TSGs have a positive impact on teacher and student outcomes, and they have been shown to do so with a variety of foci (e.g., literacy, mathematics) and through varied research designs. This work has indicated that particular components of the model may act as key levers

that influence teachers' and, ultimately, students' learning. Firestone et al.'s integrative synthesis identified three studies in which students of teachers in a TSG condition outperformed peers whose teachers were in comparison professional development (PD) conditions on measures that tapped deep, conceptual knowledge (Heller et al., 2012; Lewis & Perry, 2012; Saxe et al., 2001). The mixed methods analysis of these three studies indicated that there were two components specific to the TSG model that affected student outcomes: expert input and a close connection to teachers' daily practice. It is possible that these components facilitated teachers' enactment of new knowledge by supporting insights into their instruction, a process that Kennedy (2019) identified as a powerful predictor of whether a program affected practice in a meaningful way. Although questions remain regarding the relative impact of the TSG model's individual components—and potential interaction effects between and among those components—as a whole, this scholarship provides evidence of the model's effectiveness in developing teachers' knowledge and practice.

### **Collaborative Inquiry in the Preservice Context**

Given the empirical foundation established with practicing teachers, some scholars have examined whether collaborative, inquiry-based models for learning yield similar results with PSTs, potentially addressing persistent challenges in teacher preparation. This small but growing body of work has challenged conceptions that learning to teach is grounded in common sense and does not require the serious, sustained professional inquiry expected in fields such as medicine (Ball & Cohen, 1999; Kennedy, 1999, 2016; Munby et al., 2001). Effective teaching requires more than common sense and a set of curricular materials; moving toward a scientific professionalization of teaching requires that preparation programs develop and refine critical inquiry and collaboration skills (Ball & Cohen, 1999; Hammerness et al., 2005; Kennedy, 1999; Lampert & Ball, 1998, 1999; Sims & Walsh, 2009).

The disconnect between preparatory coursework and PSTs' formative work in classrooms (Kennedy, 1999) further underscores a need to examine the structures in which preservice learning occurs. Although coursework provides a theoretical foundation for teaching, without supported opportunities to connect that knowledge to practice, PSTs may be unable to identify situations that require knowledge and theory enactment (Kennedy, 1999, 2016). It stands to reason, then, that providing experiences that emphasize connections between coursework and clinical experiences—supported through questions, analysis, and critical reflection on classroom experiences—holds potential for developing effective teachers (Ball & Cohen, 1999; Cochran-Smith, 2020; Cochran-Smith & Lytle, 1993, 1999; Cochran-Smith et al., 2016; Darling-Hammond, 2006; Hammerness et al., 2005; Jimenez-Silva & Olson, 2012; Lampert & Ball, 1998, 1999).

However, the empirical research on collaborative learning models in the preservice context is limited ( $k = 22$ ) and largely qualitative in nature (i.e., of this body of work, 20 studies employed a qualitative methodology and the remaining two employed a mixed methodology), leaving open questions regarding impact on PSTs' knowledge and practice. The extant work suggests that a study-group model holds potential for scaffolding professional learning through facilitating dialogue about instructional successes and challenges (e.g., Ekici, 2017) and critical reflection on classroom practice (e.g., Liu & Kleinsasser, 2015). Findings also suggest that application of a study-group structure in preservice learning allows teacher educators to facilitate the deepening of content knowledge and development of inclusive teaching practices among novice teachers (e.g., Myers, 2012).

However, research has also indicated that collaborative inquiry models must be adapted to function in the preservice context. Enhanced structure and scaffolding are needed to ensure that study groups do not perpetuate misconceptions or incomplete understandings (e.g., Hawkins & Rogers, 2016; Johnson & Cotterman, 2015; Myers, 2012; Parks 2008, 2009). Without support from an expert (e.g., a course instructor), participants in preservice study groups have been shown to perpetuate unquestioned assumptions rather than drawing on knowledge of pedagogy or theory (e.g., Parks, 2009). In such cases, PSTs have strengthened inaccurate, preexisting beliefs rather than challenging them through professional inquiry. Given this phenomenon, Myers (2012) postulated that:

perhaps there is something unique about . . . the preservice teacher population as a whole, that prevents them from benefiting from the . . . process to the extent that more experienced teachers do . . . . Given the population it may be necessary to modify the process or the support mechanisms. (p. 12)

Being present in a study group does not guarantee meaningful growth, and PSTs' limited knowledge and experience necessitates higher levels of expert facilitation and support to benefit. Specifically, scaffolding is needed for PSTs to learn how to critically view a classroom and leverage opportunities to develop and transform knowledge for teaching (Johnson & Cotterman, 2015). Expert input and increased structure are necessary components in the application of collaborative inquiry groups in general, and these structures possess heightened importance in the preservice context.

## **What Do Equity-Centered Special Education Teachers Need to Know?**

### ***High-Leverage Practices***

Despite research documenting that teacher quality influences student outcomes (e.g., Graham & Flamini, 2021), and that implementation of effective teaching practices can improve student outcomes across a variety of domains (e.g., Gershenson, 2016; Hill et al., 2019; Kraft, 2019), preparation programs have struggled to graduate teachers prepared to implement effective practices for marginalized students (Lai et al., 2020). This hinders preservice special educators in developing practices that support all students in leveraging their creativity, curiosity, and problem-solving in learning (Blanton et al., 2014; Young, 2011). Given the field of special education's "tangled and complex history" (Kozleski, 2020, p. 342), this reflects a pressing need for equity-centered preparation. In response to such critiques, special education scholars have argued that identifying a set of high-leverage teaching practices, empirically linked to student outcomes, should guide content coverage in preparatory programs (Ball & Forzani, 2011; McLeskey & Brownell, 2015). Accordingly, the Council for Exceptional Children identified 22 High-Leverage Practices (HLPs) for special educators, which are relevant across content areas and represent knowledge that all special education teacher candidates should learn prior to entering the field (McCray et al., 2017). The HLPs are organized in four domains that are central to the special education practice: collaboration, assessment, social/emotional/behavioral practices, and instruction. Akin to K–12 learning standards, the HLPs describe content to be covered during the preservice period (i.e., *what* future teachers should know) without specifying *how* teacher educators should teach those topics. The TSG sessions emphasized engaging students in meaningful learning across the four HLP domains:

**Assessment.** Assessment for equity-centered instruction supports teachers in identifying students' strengths and needs. In TSG sessions, activities emphasized the importance of clarifying the area of knowledge or skill being assessed in students and ensuring that chosen assessments probe that skill or knowledge in a valid manner. For example, asking students to express understanding of content only through a written assessment task risks conflating a student's writing skill with their content understanding.

**Collaboration.** Equity-centered special educators understand that consistently working with a range of stakeholders (e.g., other teachers, staff, families, and students) is a core component of their practice. TSG sessions emphasized collaboration as ongoing dialogue in pursuit of co-constructing educational plans that support students in a sustainable and meaningful way.

**Instruction.** To design and implement accessible, rigorous instruction to all students, special educators must focus on learning goals. Inclusion hinges upon this clarity regarding learning expectations, and TSG sessions provided strategies for doing so through the design of flexible pathways for learning. Equitable instruction is strategically designed to achieve this.

**Social/Emotional/Behavioral.** The TSG sessions focused emphasized the ways in which establishing an organized, consistent, and respectful learning environment is a foundational component of student learning. Supporting students' social-emotional needs functions as a platform for implementing equity-centered pedagogy.

***Supporting Students with Mental Health Needs.*** Given that poor classroom management has been linked to low teacher retention rates and job satisfaction, the social/emotional/behavioral domain of the HLPs represents a high-priority area for improvement in special educator preparation (Flower et al., 2017; Oliver & Reschly, 2010; Scott, 2017). Student behavior remains a top concern among educators, and teachers have reported feeling that they lack requisite knowledge to teach students with challenging behaviors and mental health needs, which impedes their ability to provide many students with high-quality instruction (Chesley & Jordan, 2012; Firestone & Cruz, under review; Stough, 2006). Yet mental health is a critical aspect of students' in-school functioning and remains a common and unaddressed cause of academic struggle (Ebbert et al., 2019; Masten, 2015), suggesting that building capacity in mental-health-informed teaching practices may enhance educators' ability to equitably implement high-quality instruction.

Mental health conditions are a leading cause of disability worldwide (World Health Organization, 2019) and among the conditions that can qualify students for special education services (Individuals with Disabilities Education Act [IDEA], 2004; Skaar et al., 2020). Of the 13 disability categories under which students can be found eligible for special education, Emotional Disturbance (ED) and Other Health Impairment (OHI) are commonly applied to students with mental health needs, as both acknowledge that these students may require specialized services and supports to make educational progress. Further, it is well documented that students labeled with other disabilities often experience concurrent mental health needs (e.g., Brunelle et al., 2019) as, by adolescence, 30% to 40% of youth in the United States are diagnosed with at least one mental health condition (Kessler et al., 2012). Most of these conditions originate early in life, with median ages of onset for anxiety, behavior, and mood disorders occurring before age 14.

Left untreated, mental health conditions that emerge during the elementary school years tend to persist and cascade into problems across domains, including educational attainment, in-school behavior, and social functioning (Gartland et al., 2019). Therefore, providing effective

educational supports during the school years is critical, yet less than half of affected youth receive needed services—and this rate is more pronounced for marginalized students (e.g., Black, Latinx, Pacific Islander students, students in rural settings, and students without health insurance; Atkins et al., 2017; Larson et al., 2017). Given this treatment gap, teachers are increasingly acting as mental health providers; more than half of youth who seek services receive them in the school setting, the bulk of which are provided by teachers across the prevention-intervention continuum (Dray et al., 2017; Sanchez et al., 2018). Despite this reality, teachers continue to receive little to no training on best practices for addressing mental health in the school context, and—unsurprisingly—special educators have reported low perceptions of preparedness to meet the needs of students with mental health conditions (Firestone & Cruz, in press). Therefore, understanding effective educational practices in relation to students’ mental health is an essential component of an equitable teaching practice, particularly for special educators given their heightened likelihood of working with impacted students.

**The Role of Knowledge Calibration.** Finally, research has indicated that practitioners tend to overestimate their knowledge and lack awareness of what they do and do not know, and that this calibration—or lack thereof—between actual and perceived knowledge affects their learning (Cunningham et al., 2004). Knowledge calibration has been studied in cognitive psychology as a component of epistemic regulation (e.g., Fischhoff, 1988; Stanovich, 1999), and the construct refers to whether an individual is aware of what they know (e.g., Fischhoff et al., 1977; Ronis & Yates, 1987). Scholars have hypothesized that people acquire new information more readily when their knowledge is well calibrated, as this metacognitive awareness prompts learners to focus cognitive effort on areas in which their knowledge is limited. This suggests that research examining models for improving teachers’ knowledge and practice should consider knowledge calibration as a potential variable affecting impact. Therefore, as was performed in Cunningham et al.’s (2004) research on educators’ knowledge for teaching reading, I included this metacognitive dimension to examine whether knowledge calibration influenced participants’ learning.

### Study Purpose

Scholars have argued that programs of research on equity in teacher education should operate with the “dual purposes of continuously improving local programs, on one hand, and building theory about how, why, to what extent, and under what conditions teacher candidates learn to enact practice for equity, on the other” (Cochran-Smith et al., 2016, p. 68). Therefore, in this study I both (a) evaluated the impact of TSG participation on preservice special educators’ knowledge, practice, and attitudes, and (b) sought to build theory regarding participatory processes that lead to—or hinder—professional growth. In pursuit of these dual purposes, I employed a convergent mixed methods research design to answer the following questions:

**Table 1**

#### *Research Questions*

<b>Research Question</b>	<b>Hypothesis</b>
1. Did participation in the TSG influence PSTs’ (a) knowledge of HLPs,	Hypothesis 1: Participation in the TSG will be associated with an increase in PSTs’: (a) knowledge of HLPs,

(b) classroom practice, and (c) attitudes toward students with mental health conditions?	(b) classroom practice, and (c) attitudes toward students with mental health conditions.
1A. Was calibration between perceived and actual knowledge associated with growth in practice?	Hypothesis 1A: PSTs knowledge calibration will be associated with growth in practice.
2. How did participation in the TSG influence PSTs': (a) knowledge of HLPs, (b) classroom practice, and (c) attitudes toward students with mental health conditions?	Hypothesis 2: Participants' improvements in knowledge, practice, and attitudes will manifest through the TSG's coherence with their daily practice, critical dialogue with colleagues, and expert input by the facilitator.
3. How do the qualitative and quantitative data confirm, expand, or complicate one another?	Hypothesis 3: Data integration will support identification of meta-inferences regarding participants' thinking and experiences, illuminating the pathways through which professional learning occurs.

*Note.* Research Question (RQ) 1 = quantitative questions; RQ2 = qualitative questions; RQ3 = mixed methods question

I subsequently detail the conceptual framework, which functioned as both a guide and a ballast (Ravitch & Riggan, 2012) for conceptualizing, designing, and implementing the study as well as integrating and interpreting the qualitative and quantitative data. I then describe the research design, data collection, analytic strategy, and instrumentation, followed by a detailed description of findings, and I conclude with a discussion of implications and future directions with an eye toward equity-centered research, practice, and theory development in teacher education.

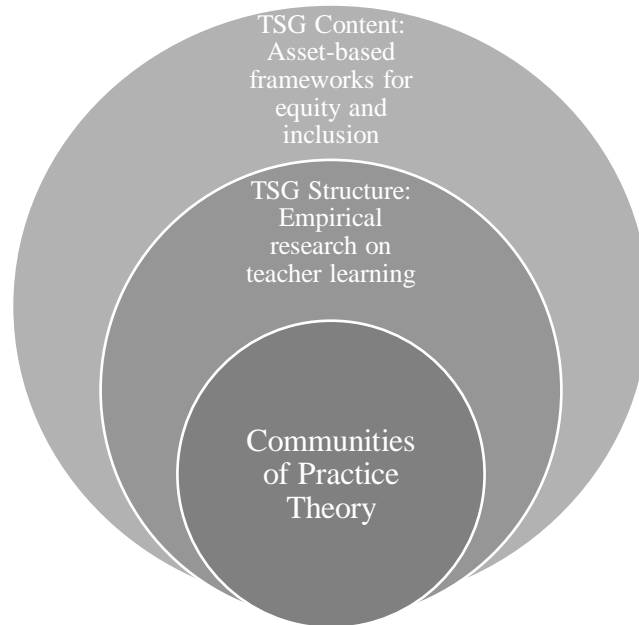
### **Conceptual Framework**

The conceptual framework articulated (Collins, 2019) socio-cultural learning theory, which describes how professional learning occurs in a community of practice (COP), with empirical research on teacher learning, and asset-based pedagogical frameworks for equity. COP theory hypothesizes how and why learning occurs in professional communities, and this conception of learning through practice represented the theoretical core of this research. Empirical scholarship on teacher learning informed the translation of COP theory to a TSG structure that was appropriate in the preservice context. Finally, asset-based pedagogical approaches to equity informed the content delivered through the TSG (see Figure 1).



## Figure 1

*Conceptual Framework: Articulating Theory and Empirical Research to Inform Structure and Content*

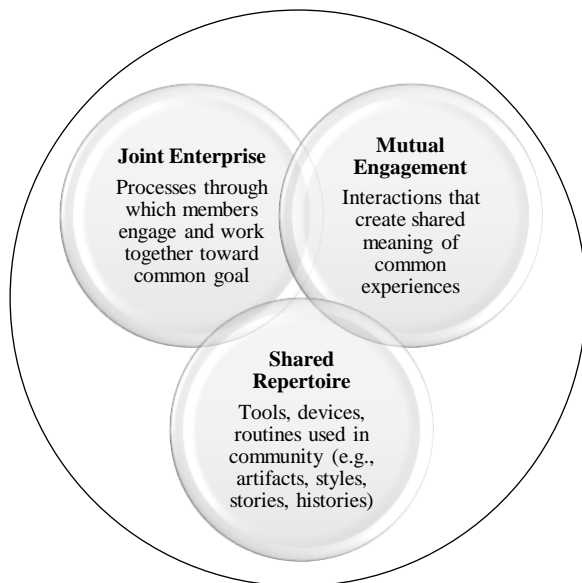


### **Theoretical Underpinnings: Communities of Practice**

With origins in social theory and anthropology (Lave, 1988; Vygotsky, 1978), COP theory provided the theoretical foundation on which the TSG was premised. In this framework, a COP refers to a community in which professional learning occurs when it includes three components: It is (a) a joint enterprise (e.g., participants are all committed to improving their practice), in which members are (b) mutually engaged, and (c) draw upon a shared repertoire of resources (e.g., Wenger, 1998). Community membership involves the ongoing negotiation of meaning, which is a dynamic practice composed of participation and reification. Professional learning occurs through the ongoing practice of community membership, which includes collaboration, disagreement, reflection, and enculturation of new members. Through this lens, learning is conceptualized not as the transportation of a discrete body of decontextualized knowledge from expert to learner—as it is commonly treated in traditional lecture courses delivered apart from clinical experiences—but rather a continuous and dynamic negotiation of meaning that transpires within a community of learners actively connected to practice. In this conception of learning as a social process, learning to teach is understood as a complex and dynamic practice borne through discussion and reflection. Teachers' professional growth is a multifaceted intellectual activity that requires deep conceptual knowledge and highly contextualized decision-making, which are developed and refined through ongoing engagement in a COP (Brown & Campione, 1996; Wenger, 1998). Figure 2 illustrates the internal components of the core theory circle in the center of Figure 1.

**Figure 2**

*Learning in Community: Requisite Components of a COP*



*Note.* See Wenger (1998).

**From COP to TSG: A Structure for Preservice Learning**

This COP framework guided development of a theory-grounded TSG model for preservice teachers. In doing so, I articulated COP theory with empirical research on teacher learning, which has identified six core features of effective models for educator development (Desimone & Garet, 2015; Firestone et al., 2020). These include:

- (a) A specific focus: The TSG focused on a single topic (e.g., equity-centered pedagogy) with a pre-planned scope and sequence.
- (b) Active learning: Teachers engaged in collaborative planning for implementation, analysis of student work, presentation, reflection, and feedback.
- (c) Coherence: Activities and content were calibrated with participants' needs and context-specific curricula, goals, and assessments.
- (d) Sustained duration: Participation was ongoing (i.e., spread across a semester) and regular (i.e., weekly).
- (e) Collective participation: As much as possible, groups comprised teachers of the same subject, grade level, and/or school location to build authentic learning communities.
- (f) Expert input: A course instructor facilitated each session to build collective knowledge and protect against the perpetuation of flawed assumptions.

In addition, rather than delivering a set of prescriptive techniques to participants, the TSG structure drew on Kennedy's work (2016), which has indicated that teachers experience professional growth when learning experiences prompt insights into practice. Kennedy referred to these as "'aha!' moments" (p. 955), which change teachers' interpretations of classroom situations and how they respond to them. Study groups were therefore structured to prompt

insights through iterative rounds of critical questions, supported application, and focused reflection on equity-centered practices.

### **TSG Content: Cross-Pollination of Foundational Equity Frameworks**

As described in the previous section, the research has indicated that effective study groups have a singular focus on which members mutually engage. Given the need for equity-centered teacher preparation, the TSG focused on building PSTs' capacity to enact equity-centered pedagogy. Conceptions of equity-centered teacher preparation have evolved over the past decade. Sleeter and Owuor (2011), for example, indicated that it should include:

preparing teachers to form relationships with students from backgrounds different from their own backgrounds, to bridge home and school cultures, to integrate multicultural content into the curriculum, to use pedagogy equitably in the classroom so they teach all students well, to reduce prejudice and build relationships among students, and to be change agents who can recognize and challenge injustice. (p. 524)

In relation to the instructional domain, equity-centered teachers understand how to select meaningful content, design learning opportunities aligned with valued outcomes, connect content to students' lived experiences, use evidence to scaffold learning and improve teaching, and adopt an inquiry stance to practice (Cochran-Smith et al., 2016). In addition to the instructional domain, TSG content on collaboration, social/emotional/behavioral support, and assessment emphasized the importance of understanding students' identities as intersectional (Crenshaw, 2017; Maroto et al., 2019) and dynamic, and that pedagogy must sustain "ethnic, racial, and language differences simultaneously and intentionally" (Waitoller & King Thorius, 2016, p. 367).

Each session was grounded in the rich literature available on effective teaching (see Hamre et al., 2013). The TSG operationalized equity-centered pedagogy as that which renders meaningful, rigorous learning experiences accessible to all students (Noguera et al., 2015; Vaughn et al., 2015). The scope and sequence (Table 2) prompted teachers to conceptualize students as existing dynamically across diversity spectra (e.g., cognitive, social/emotional, racial, linguistic) and emphasized strategies for sustaining this variability to facilitate engagement in meaningful learning. Weekly content emphasized strategies for building positive teacher-student relationships, deepening content rigor, and leveraging frameworks for accessible learning, with an explicit emphasis on the potential in "cross-pollinating" Universal Design for Learning (UDL) and culturally sustaining pedagogy (Waitoller & King Thorius, 2016).

Grounded in access, UDL contends that flexibility in lesson design reduces barriers to learning and renders high achievement expectations attainable for all students. The framework emphasizes how environmental factors can disable students from learning, shifting away from framing dis-ability as a barrier to learning inherent in particular students. Human variability is understood as a natural phenomenon and, thus, instructional design must consistently plan for learning differences. To ensure that instruction is universally accessible, the UDL framework stipulates three guiding principles of instructional design: multiple means of (a) representation, (b) action and expression, and (c) engagement (Hall et al., 2012).

UDL is commonly taught in special educator preparation in varying degrees of depth and breadth (e.g., Courey et al., 2013; Scott et al., 2019), however the framework has been critiqued for overlooking the role of students' cultural backgrounds in learning. I therefore applied

Waitoller and King Thorius' (2016) argument that culturally sustaining pedagogy—which fosters linguistic, literate, and cultural pluralism (Paris, 2012)—be cross-pollinated with UDL to design learning that holistically leverages students' assets, backgrounds, and learning preferences. TSG content referred to this cross-pollinated approach to instructional design as *critically inclusive pedagogy* (Cruz et al., in press) across the four domains, conceptualizing equity-centered teaching as universally accessible, rigorous learning that builds students' critical literacy and numeracy (Cochran-Smith, 2020). Through participation in the TSG, teachers were supported in reifying critically inclusive pedagogy in their practice. The goal of each TSG session was for PSTs to develop capacity to remove barriers that force students to engage in unproductive struggle and, instead, to maximize opportunities for productive struggle that supports critical thinking, problem-solving, and analysis. Model lessons and strategies featured multiple representations of content and multiple avenues to engage in learning and showcase knowledge, using elements that drew from students' lived experiences and interests.

Other pedagogical tools featured in TSG sessions (see Table 2 for Scope and Sequence) drew from frameworks related to developing heterogeneous student groups (e.g., Complex Instruction; Cohen & Lotan, 2014) and inquiry-based approaches to learning (e.g., Brahier, 2008). These strategies helped PSTs facilitate development of students' higher-order thinking skills by fostering equal status in groupwork and shifting the teachers' role in ways that frame all students as problem-solvers, critical thinkers, and co-constructors of knowledge (e.g., Lambert & Tan, 2017). These strategies aligned with conceptions of deeper learning (Noguera et al., 2015; Vaughn et al., 2015)—ambitious, meaningful tasks that engage students in active problem-solving and inquiry, prioritizing depth of understanding over breadth of content coverage. Such approaches to learning, as Alim et al. (2020) problematized, have been historically reserved for affluent, white learners, whereas decontextualized, procedurally focused curricula have remained common for BIPOC and students labeled with disabilities (Bannister, 2016; Lambert, 2018).

**Table 2**

*TSG Scope and Sequence*

<p><b>Module 1: Social-Emotional-Behavioral Support and Collaboration</b>            High-Leverage Practices (HLPs) addressed in this module:</p> <ol style="list-style-type: none"> <li>(1) Collaborate with professionals to increase student success</li> <li>(2) Organize and facilitate effective meetings with professionals and families (IEPs)</li> <li>(3) Collaborate with families to support student learning and secure needed services</li> <li>(4) Use multiple sources of information to develop comprehensive understanding of a student’s strengths and needs</li> <li>(5) Use student assessment data, analyze instructional practices, and make necessary adjustments that improve student outcomes.</li> <li>(6) Establish a consistent, organized, and respectful learning environment</li> <li>(7) Provide positive and constructive feedback to guide students’ learning and behavior</li> <li>(9) Teach social behaviors</li> <li>(10) Conduct functional behavioral assessments to develop individual student behavior support plans</li> <li>(11) Identify and prioritize long- and short-term learning goals</li> <li>(12) Systematically design instruction toward a specific learning goal</li> <li>(13) Adapt curricular tasks and materials for specific learning goals</li> <li>(19) Use assistive and instructional technologies</li> <li>(20) Provide intensive instruction</li> </ol>	
<b>Session: Topic</b>	<b>Overview</b>
Session 1: Introduction to TSGs	Research behind TSGs, study purpose, logistics and scheduling, getting to know the group
Session 2: Classroom Management and Externalizing Support Needs	Strategies for building relationships with students; supporting positive behavior; building students’ self-determination; check-in, check-out support from a sociocultural lens
Session 3: Social-Emotional Development and Internalizing Support Needs	Social emotional development; universal practices for social-emotional support
Session 4: Mental health within an MTSS Framework	Understanding student mental health in the educational context; mental health strategies for inclusive student well-being
<p><b>Artifact examples:</b><sup>a</sup></p> <ul style="list-style-type: none"> <li>• Photos of classroom expectations and/or environmental design of the classroom</li> <li>• Photos or examples of positive reinforcement systems implemented</li> <li>• Artifacts demonstrating collaboration with mental health practitioners, counselors, or other support personnel related to mental health and wellness</li> <li>• Assessments used to determine student strengths and preferences</li> <li>• Materials used to support families in understanding student needs</li> <li>• Transcript or written summary of interview with a student</li> </ul>	

## Module 2: Instructional Support and Assessment

HLPs addressed in this module:

- (6) Use student assessment data, analyze instructional practices, and make necessary adjustments that improve student outcomes.
- (10) Provide positive and constructive feedback to guide students' learning and behavior
- (11) Identify and prioritize long- and short-term learning goals
- (12) Systematically design instruction toward a specific learning goal
- (13) Adapt curriculum tasks and materials for specific learning goals
- (14) Teach cognitive and metacognitive strategies to support learning and independence
- (15) Provide scaffolded supports
- (16) Use explicit instruction
- (17) Use flexible grouping
- (18) Use strategies to promote active student engagement
- (19) Use assistive and instructional technologies
- (20) Provide intensive instruction
- (21) Teach students to maintain and generalize new learning across time and settings

Session 5: Planning Instruction	Introduction to critically inclusive practices; shifting from deficit perspectives, framing students as co-constructors of knowledge, culturally sustaining pedagogies
Session 6: Intensifying Instruction	The “what” of learning: Providing options for perception of information, promoting understanding across languages, using multimedia, highlighting big ideas; constructing multiple avenues into rigorous content; varying demands and resources to optimize challenge
Session 7: Culturally sustaining and universally designed instruction	Student-driven, project-based, and culturally validating practices; providing options for recruiting interest, sustaining effort and persistence, and self-regulation; providing a “hook” to recruit student interest
Session 8: Using flexible grouping	Building student engagement through status and intentional group design; small-group roles and accountability; complex Instruction
Session 9: Inquiry-based instruction	Designing lessons with inquiry in mind; cycles of instruction across units; teaching through misconceptions; the “why” of learning: providing options for method of response (e.g., multimedia) and enhancing capacity for students to self-monitor progress; Deeper Learning
Session 10: Topic determined by needs and interests of group	Content co-constructed based on teacher-identified contextual needs
<p><b>Artifact examples:</b></p> <ul style="list-style-type: none"> <li>• Lesson plans, unit plans, student work samples, interpretation of class data or work samples compared to lesson learning objectives</li> <li>• Video clips of instruction or student engagement</li> <li>• Lesson materials and other artifacts that showcase student understanding of concepts</li> <li>• Lesson materials from the general education curriculum adapted to embed UDL principles</li> <li>• Examples of curriculum examined critically for cultural bias and adapted for inclusivity</li> <li>• Photos or examples of materials designed to build vocabulary, language, and literacy skills for emerging bilingual learners</li> </ul>	

<sup>a</sup> Participants shared an artifact from their practice during each session.

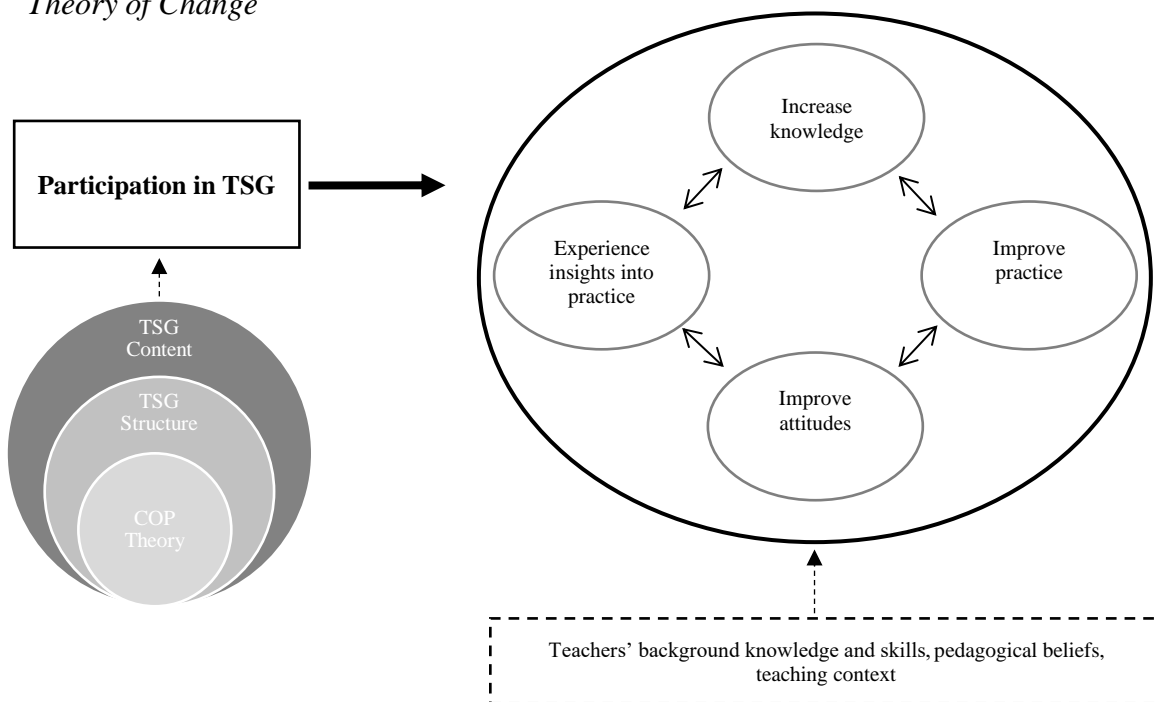
## Theory of Change

I theorized that TSG participation would influence PSTs' practice through a recursive pathway: Through participation, teachers would (a) increase their knowledge of HLPs, (b)

experience insights into their practice, (c) improve their attitudes toward students with mental health needs, and (d) improve their instruction. As teachers experienced these changes, they would continue engagement in the TSG, which will lead to further improvements in practice. As depicted in Figure 3, I also theorized that teachers' background knowledge and skills, pedagogical beliefs, and teaching context would influence their knowledge acquisition and enactment. In the research design, I accounted for these factors through flexible grouping (e.g., by subject area, school, grade-level), reserving of the second-to-last TSG session for topics that participants deemed important, and ongoing solicitation of participant feedback (e.g., consistent polling and interviewing of PSTs to understand current problems of practice and classroom needs).

**Figure 3**

*Theory of Change*



## CHAPTER II: METHOD

To develop high-quality preservice learning experiences that engender meaningful changes in practice, it is imperative to invest in rigorous rounds of experimentation in the program-design phase. Accordingly, Hill et al. (2013) proposed a three-phase progression for program development research, which emphasizes rigor during the initial stages to develop empirically sound models for teacher learning prior to scaling, for example, to randomized control trials (RCTs). In this approach, Phase 1 is a one-site pilot designed to establish program feasibility with teachers in an authentic learning context (e.g., one university program). This phase uses iterative design cycles, in which versions of a program are assessed in successive rounds with subgroups of participants, with new permutations and adaptations emerging via participant feedback and developer observations. Data collection during this phase includes both informal feedback from participants regarding perceptions and proximal outcomes, such as knowledge measures related to the topic of focus.

Phase 2 is a small-scale RCT, which holds content constant while systematically varying features of program delivery in cross-site research with multiple facilitators (i.e., non-program developers). This adjudicates site- and facilitator-specific effects and clarifies model mechanisms that influence outcomes of interest. At the end of Phase 2, Hill et al. (2013) recommend that researchers test for effects in treatment versus control conditions and inspect differences on proximal outcomes, including student achievement when relevant. Researchers can then integrate data, weigh the cost of each design, and consider available information on student impact. This allows for informed program design that maximizes the likelihood of affecting student outcomes prior to enacting a large-scale RCT in Phase 3. This dissertation is positioned as Phase-1 research in the Hill et al. paradigm.

### **Research Design Overview**

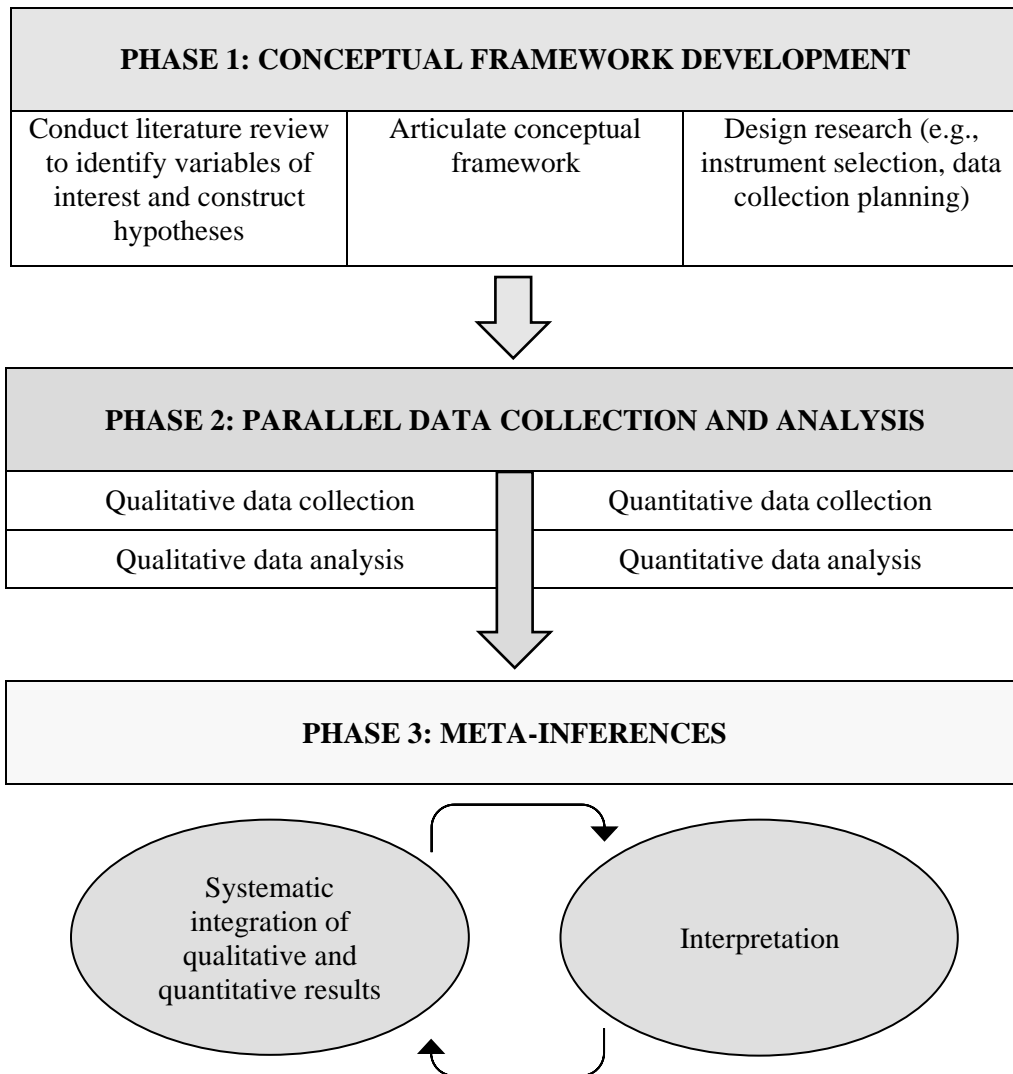
To explore the feasibility and influence of the TSG course on preservice teachers' knowledge, practice, and attitudes, I employed a mixed methods approach. Mixed methods research is a relatively new methodology, originating in the late 1980s in work across disciplines including evaluation, education, sociology, and health sciences (see Creswell & Plano Clark, 2011), and it involves the collection, analysis, and systematic integration of quantitative and qualitative data to understand complex phenomena. Employing mixed methods allowed me to draw on the strengths of both qualitative and quantitative paradigms to understand PSTs' professional growth through participation the TSG course.

In alignment with Hill et al.'s (2013) conception of Phase 1 research, the two program developers (i.e., another researcher and I), delivered the semester-long TSG course over three successive semesters in seven different teacher-education courses. Prior to Phase 1 implementation, I conducted a pilot version of the program. Given the fixed window of participation time (i.e., one semester), I employed a convergent mixed methods design (Creswell, 2014; Figure 4). In this approach, a researcher collects quantitative and qualitative data simultaneously, analyzes them separately, and then integrates those results to evaluate whether and how findings confirm, expand upon, or disconfirm one another. The underlying assumption of this approach is that both types of data provide different types of information, and together they yield results that lead to understandings beyond those achieved by mono-method approaches (Creswell, 2014). See Figure 4 for research design overview.



**Figure 4**

*Procedural Diagram*



**Participants**

I recruited participants from special educator fieldwork support courses at one university over three successive semesters of implementation. These courses were required for all credential candidates completing fieldwork in K–12 classrooms. Courses offered guidance and support to PSTs as they worked in classrooms, providing a forum for discussion on a range of pedagogical topics and fulfillment of credential requirements.

To recruit participants in alignment with university review board protocol, either I—in the case of courses in which I was not the instructor—or a colleague—in the case of courses in which I was the instructor—visited the course at the beginning of the semester, explained the research and the informed consent, and distributed it to students. This presenter then left the course. Students who opted to participate turned in the signed form to that presenter via email or electronic agreement (i.e., DocuSign). All students participated in the TSGs as part of the course,

however consenting to participate in the research meant that they agreed to their anonymized data being used in this research.

Over the three semesters of implementation, a total of 60 preservice special educators consented to participate. In Semester 1, 8 participants from one course consented to participate; in Semester 2, 25 participants from two courses consented to participate; and in Semester 3, 27 participants from two courses consented to participate. All participants were enrolled in the same special education credential program for students with mild to moderate support needs. See Table 3 for descriptive characteristics.

**Table 3**

*Descriptive Characteristics of Participants*

Category	<i>n</i>	%
Years teaching <sup>a</sup>		
0–1	12	20
2–5	32	53
6–10	10	17
11–20	4	7
20–30	2	3
Fieldwork grade level		
Elementary school	25	42
Middle school	14	23
High school	19	32
Post-secondary	2	3
Fieldwork school type		
Public	50	83
Private	6	10
Magnet	1	2
Charter	3	1
Primary practice area		
High-incidence disabilities	52	87
Autism	6	10
Social-emotional needs	2	3
Credentials held		
Special education intern credential	45	75
General education credential	8	13
None	7	12
Gender		
Female	42	70
Male	18	30
Race <sup>b</sup>		
Asian	13	22
Black/African American	6	10
Latinx	12	20
Mixed	1	2
Native American	1	2
Other	2	3
White	26	43

<sup>a</sup> Reflects number of years participants had worked in classrooms in any capacity (e.g., assistant, teacher without a license).

<sup>b</sup> Participants who reported two races are represented in each category. Participants who reported their race as “mixed” but did not specify further are represented in the “mixed” category.

### ***Program Description***

After piloting the TSG in Spring 2018, I collected data over the course of three semester-long iterations of implementation, feedback, analysis, and refinement (Borko et al., 2007; Brown, 1992; e.g., Cunningham et al., 2015). In the pilot, the TSG began as a month-long module about student mental health. Based on feedback from participants and the course instructor, I refined the TSG curriculum for the Phase-1 implementation (Hill et al., 2013) to span 10 sessions across a full semester. This expanded program broadened in focus to cover the full swath of HLPs (see Table 2), framed through a critically inclusive lens. Throughout each period of implementation, I collected feedback data from participants and my co-researcher, which guided refinements.

### **Teacher Study Group Format**

The 10 TSG sessions occurred weekly during the courses' scheduled meeting times, beginning a few weeks into the semester following the course introduction and a session highlighting the intention and importance of each component of the approach and explaining the research. In Semester 1, I was the assigned course instructor and therefore facilitated the TSGs; in Semesters 2 and 3, the assigned course instructors—one of which was me and the other of which was my co-researcher—facilitated the TSGs. Both instructors had extensive knowledge of inclusive education practices and experience as K–12 classroom teachers and teacher educators. We tracked fidelity of implementation using a checklist of key facilitator actions, which was completed after observing the TSG sessions, either in-person or debriefing with the facilitator immediately after.

At the beginning of each semester, I assigned participants to study groups of four to five PSTs. Groupings were based on type of teaching placement and grade level to group PSTs with similar teaching contexts. Each two-hour session followed a four-step process, adapted from Cunningham et al. (2015): (a) reflection on implementation from the previous week, (b) new content presentation, (c) collaborative planning for implementation of new content over the next week, and (d) review and answering of questions. During the reflection portion, participants discussed the implementation that they had enacted since the prior TSG session, which related to that session's topic; this lasted approximately 30 minutes. For example, following a session focused on students' mental health, teachers would implement a related practice in their classrooms over the following week. They would discuss this implementation during the reflection portion of the subsequent session. As part of these weekly reflections, teachers were required to share an artifact from implementation (e.g., a picture, a lesson plan, student work). Based on participant feedback, in Semesters 2 and 3 the facilitator floated among the groups, scaffolding discussion as needed during this time.

Next, the facilitator presented new content for approximately 30 minutes. Each presentation began with guiding questions, allowed for discussion of relevant research on the weekly topic, and provided models and guidelines for implementation. Throughout each presentation, the facilitator emphasized connections between the content and participants' classroom practice. Following the presentation, teachers reconvened with their study groups to plan for implementation of a practice or strategy introduced in the presentation. This varied by session, and included practicing a new technique, discussing ideas for implementation, and providing one another with feedback. The bulk of each session was allocated to this collaborative planning (i.e., approximately 50 minutes). Finally, to conclude each session, the facilitator reviewed key points and answered any questions that arose during the collaborative planning phase. This included revisiting the guiding questions and distributing a research brief, a one-to-

two-page handout recapping the day's content. This final phase of each TSG session lasted approximately 10 minutes.

## **Data Collection**

In alignment with guidelines for convergent mixed methods research, I collected quantitative and qualitative data using parallel variables, constructs, and concepts (Creswell, 2014). Given the small scale of this experiment, the sample size ( $N = 60$ ) was the same for both the quantitative and qualitative data; all participants contributed both forms of data. This represented a strength of this study given that, in making comparisons between the two databases, "the more they are similar, the better the comparison" (Creswell, 2014, p. 222).

### ***Quantitative Data Collection***

**Knowledge of HLPs.** I measured participants' pedagogical knowledge at the beginning and end of the course using the *Teacher Knowledge of HLPs* (TKHLP; Firestone et al., 2021) instrument, which is designed to assesses special educators' knowledge of the HLPs (McLeskey et al., 2017). Items measure teachers' knowledge in the four HLP domains: instruction, assessment, social-emotional-behavioral support, and collaboration. Item scores are averaged to calculate a final score for each participant, which quantifies their knowledge on a 0 to 3 scale (0 = *no knowledge*, 1 = *limited knowledge*, 2 = *some knowledge*, 3 = *extensive knowledge*). I constructed a growth-in-knowledge variable for each participant by subtracting their beginning- from their end-of-semester scores. This instrument was developed using a construct modeling approach (Wilson, 2005), and its Cronbach's alpha was 0.83, indicating good reliability. A full description of instrument development and evidence of validity (American Educational Research Association et al., 2014) can be found in Firestone et al. (2021; see Appendix A for instrument).

**Knowledge Calibration.** Participants answered 22 questions to establish their perceived knowledge of HLPs. These items asked participants to rate their knowledge of each practice on a scale of 0 to 100 (0 = *no knowledge*, 100 = *extensive knowledge*), using a sliding tool (e.g., "Please rate your level of knowledge of: Using multiple sources of information to develop a comprehensive understanding of a student's strengths and needs"). I averaged participants' responses to produce a total perceived knowledge score. I generated a knowledge calibration variable for each participant using their actual knowledge score and these perceived knowledge scores at the beginning of the semester, first transforming actual and perceived knowledge variables into  $z$  scores ( $\bar{x} = 0$ ,  $s = 1$ ), and then subtracting the standardized actual knowledge score from the standardized perceived knowledge score. This provided a calibration variable for each participant, with 0 indicating calibration, a positive number indicating underestimation of knowledge, and a negative number indicating overestimation of knowledge (see Appendix B for instrument).

**Teaching Practice.** I obtained pre- and post-intervention scores for each teacher's practice through scored observations of two instructional videos, one from the beginning of the semester and one from the end. I scored each video using the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008; see Gregory et al., 2016; Hamre et al., 2013), an instructional observation protocol with strong evidence of validity, reliability, and fairness (American Educational Research Association et al., 2014). The CLASS is a general measure of practice, not directly aligned with the TSG scope and sequence; rather, it functioned as a holistic measure of instructional quality that aligned with the pedagogical skills emphasized in the TSGs: supportive student-teacher interactions, instructional practices that build critical thinking and

problem-solving skills, effective assessment practices, and collaboration. Although an instrument tailored to the TSG may have yielded different results (Ruiz-Primo et al., 2002), the CLASS aligned with the equity focus, probing the quality of teacher-student interactions and features of positive, motivating, and cognitively challenging classrooms (Gregory et al., 2016).

The CLASS quantifies instructional behaviors across three domains—emotional, organizational, and instructional support—each of which is composed of individual dimensions scored on a 7-point scale (1 = *minimally characteristic* to 7 = *highly characteristic*). Each domain score represents the mean of the dimension scores within that domain. In addition to having strong psychometric properties, the CLASS aligned with the practices I sought to capture, emphasizing student-teacher interactions and instructional practices that build critical thinking and problem-solving skills. I established scoring reliability by having my co-researcher and I score a set of eight instructional videos, on which we achieved 80% exact agreement. We then discussed and calibrated areas of disagreement until we reached 100% agreement, and then I scored the remaining videos. Throughout the period in which I scored, we met regularly to prevent drift. After scoring was complete, I randomly selected 20% of the individually scored videos to calculate interrater agreement, which resulted in an average of 81.7% exact match. I constructed a growth-in-practice variable for each participant by subtracting their beginning-of-semester from their end-of-semester scores. The CLASS is copyrighted and therefore not included as an appendix.

**Teacher Attitudes.** I measured teachers' attitudes toward students with mental health conditions with the Mental Illness Stigma Scale (Day, 2003; Day et al., 2007; see Appendix C). This 28-item instrument is composed of seven subscales that probe individuals' beliefs related to mental health conditions. Subscales include (a) anxiety: feelings of nervousness, fear, or danger toward those with mental health conditions; (b) relationship disruption: whether or not someone believes they can have a normal, healthy relationships with someone with a mental health conditions; (c) hygiene: beliefs about the ability of individuals with mental health conditions to take care of basic personal needs; (d) visibility: whether the respondent believes they can recognize a person with a mental health condition; (e) treatability: beliefs regarding whether mental health conditions can be treated; (f) efficacy: the belief that mental health professionals have the skills to treat mental health conditions; and (g) recovery: beliefs regarding whether a person can recover from mental health conditions. Items are scored on a 7-point Likert scale (1 = *completely disagree* and 7 = *completely agree*). I computed mean scores for each subscale, which resulted in an aggregate score for each participant.

The scale is designed for use with English-speaking adult populations. For the present study, I modified the items to focus on teachers' attitudes toward students with mental health conditions by replacing the word "person" with "student." For example, an item in the original scale that read: "I don't think that it is possible to have a normal relationship with a person with a mental illness" was modified to read: "I don't think that it is possible to have a normal relationship with a student with a mental illness." In previous validation studies of the unmodified instrument, each subscale demonstrated adequate or better internal consistency, with Cronbach's alphas of 0.90, 0.84, 0.83, 0.78, 0.71, 0.86, and 0.75 (Day, 2003; Day et al., 2007). I calculated internal consistencies for each subscale using the present study sample (i.e., using the modified student-focused language), and the resulting reliability estimates maintained acceptable levels given the wording modifications (0.92, 0.82, 0.88, 0.74, 0.71, 0.75, 0.92).

**Teaching Context.** Participants completed the knowledge assessments and provided background information via Qualtrics. This included demographic data and information on their

teaching context. I coded teaching context into four categories: (a) coteaching with a general education teacher, (b) conducting small-group instruction by pulling students out of general classrooms, (c) some combination of both, and (d) teaching in a setting segregated from general education peers.

### ***Qualitative Data Collection***

To explore participants' knowledge, practice, attitudes, and experiences over the course of the semester, I collected qualitative data from two sources. First, to deepen understanding of practice as an evolving process, I collected teaching artifacts that participants were required to share during each TSG session (e.g., lesson plans, student work samples), which related to their reflections on implementation. Second, I collected reflections that participants wrote and shared following each session. These provided (a) context for the teaching artifact, including explanation of why they selected it for discussion and (b) details about their TSG discussion and reflections on takeaways from that week's session. Qualitative analyses provided information regarding how participation led to changes in practice, including PSTs' cognitive processes as they grappled with new content (i.e., the "aha" moments; Kennedy, 2016).

### **Analytic Plan**

Working in the convergent research design, I analyzed the quantitative and qualitative data separately prior to conducting an integrated analysis using joint displays (Haynes-Brown & Fetters, 2021), an analytic method that juxtaposes quantitative and qualitative data. Recursive rounds of constructing, analyzing, critiquing, and reconstructing joint displays revealed complexities that would not have been apparent with a single-method approach.

### ***Quantitative Analysis***

RQ1 asked whether participation in the TSG influenced teachers' (a) knowledge of HLPs, (b) classroom practice, and (c) attitudes toward students with mental health conditions. To answer this, I conducted paired-sample *t* tests using mean scores from the (a) TKHLP, (b) CLASS, and (c) the Mental Illness Stigma Scale. These tests determined whether the mean of the dependent variables showed meaningful differences between participants' pre- and post-scores. As mentioned, the CLASS probes three domains of teachers' practice: Emotional Support, Classroom Organization, and Instructional Support in addition to Student Engagement, a global measure of student functioning. Each domain is composed of multiple dimensions. The Emotional Support domain consists of Positive Climate, Teacher Sensitivity, and Regard for Adolescent Perspectives. The Classroom Organization domain consists of Behavior Management, Productivity, and Negative Climate. The Instructional Support domain consists of Instructional Learning Formats, Content Understanding, Analysis and Inquiry, and Quality of Feedback. I used grade-level appropriate protocols, adapting for cross-level consistency as needed; for example, I measured Student Engagement across all grade levels, although the early elementary protocol does not include this component. As the CLASS follows a four-factor structure (Hafen et al., 2015), I calculated each participant's mean pre- and post-overall score, and whole-group means for each domain, dimension, and student engagement.

RQ1A asked whether calibration between perceived and actual knowledge was associated with growth in participants' practice. I conducted a series of ordinary least squares linear regression models to examine teachers' growth in practice and variance attributed to knowledge calibration and actual knowledge.

### ***Qualitative Analysis***

The third research question asked how participation influenced teachers': (a) knowledge of HLPs, (b) classroom practice, and (c) attitudes toward students with mental health conditions. To explore aspects of participation that were salient in affecting change in these constructs, I analyzed the qualitative data using Miles et al.'s (2020) systematic approach to analysis, working in MAXQDA (Version 20.4.1). There, I performed two cycles of coding to generate conceptual categories and overarching themes with relevance to the conceptual framework. In the first coding cycle, I used an eclectic coding method (Saldana, 2021) to capture the essence of teachers' growth over the semester. This approach integrated: (a) hypothesis coding (Bernard, 2018; Saldana, 2021), as I began with researcher-generated codes to assess the theoretical model; (b) process coding (Charmaz, 2015), which uses gerunds to connote action; and (c) descriptive coding (Miles et al., 2020) to note emergent themes and patterns. In the second coding cycle, I used a focused coding strategy (Charmaz, 2014) to develop larger categorical and conceptual patterns from the first cycle (Saldana, 2021), condensing codes into fewer categories.

I used several strategies to establish evidence of validity and trustworthiness throughout the qualitative analysis. The connection between this empirical study, the literature review, and the conceptual framework presented provide evidence of theoretical validity (Ravitch & Carl, 2016). Data triangulation established further validity evidence, as I assessed coherence among multiple points of data collection throughout study implementation and analysis (e.g., observations, written reflections, teaching artifacts; Miles et al., 2020). In addition, I ensured fidelity to the codebook by assessing for intercoder agreement; my co-researcher scored a random sample of 20% of the documents at the end of each semester of implementation, which resulted in 89.2% agreement. Throughout analysis, we met to discuss emergent codes to prevent drift and modify the codebook as needed. Finally, during second-order coding, I coded data in a case-level meta-matrix (Miles et al., 2014) to ensure that coded sections aligned with definitions in the master codebook, evaluating the conceptual coherence.

### ***Mixed Methods Analysis***

The fourth research question asked how the qualitative and quantitative data confirm, expand upon, or complicate one another? To answer this, I used joint displays to merge the datasets in an integrated analysis (Haynes-Brown & Fetters, 2021), which occurred through the development of successive visual representations of mixed data (Guetterman et al., 2015). Rather than a summative representation of findings, visual displays are an analytic method for assessing coherence among findings (Bazeley, 2018), which substantiated my final interpretations of results.

In alignment with joint display analysis guidelines, I clarified the analytic intent prior to integration (Haynes-Brown & Fetters, 2021), which focused on insights into impact and impetus for change. I then began iterating different representations of the data, experimenting with a variety of visual representations and juxtapositions. For example, I created joint displays that depicted trend groups of participants based on CLASS scores (e.g., those whose scores increased in most dimensions vs. those whose scores did not). Through the process of constructing these displays, I created displays for individual participants and for various subgroups. Over the course of these iterations, my co-researcher and I met weekly to discuss potential configurations for data convergence. We concluded that aggregate findings were best communicated through quantitative analyses, and we agreed to explore single-participant and subgroup configurations that highlighted key themes related to changes in practice. Creating these joint displays allowed

us to examine unique participatory experiences in relation to each construct of interest. The joint display analysis was recursive, as we generated and explored multiple representations of participants' data. In the results section, I detail this process, examples, and key findings.



## CHAPTER III: RESULTS

In alignment with a convergent mixed methods approach, I first analyzed the quantitative and qualitative data separately and then performed a merged analysis using joint displays (Creswell & Plano Clark, 2018). The strength of taking a mixed methods approach lies in the ability to generate meta-inferences, which “link, compare, contrast, or modify inferences generated by the qualitative and quantitative strands” (Teddlie & Tashakkori, 2009, p. 300) that would not be achieved through either approach alone (Creamer, 2018). Therefore, in this chapter I describe the separate quantitative and qualitative analyses and conclusions prior to detailing the data merging and resulting meta-inferences.

### **Overall Impact: Quantitative Analysis**

The first research question asked whether participation in the TSG affected teachers’ (a) knowledge of HLPs, (b) classroom practice, and (c) attitudes toward students with mental health conditions. Quantitative analyses provided evidence of significant growth in teachers’ practice and knowledge over the course of participation, but no significant change in attitudes toward students with mental health needs. Data provided continuous measures representing teachers’ practice, change in practice, knowledge, change in knowledge, attitudes toward students with mental health conditions, change in attitudes, and knowledge calibration; it also included categorical indicators of teaching context (i.e., co-teaching, pull-out, a combination of both, and teaching in a segregated setting).

I began the quantitative analysis by examining descriptive statistics, performing visual analyses of central tendency measures (i.e., box plots) and correlations (i.e., scatterplots). Figure 5 depicts box plots for participants’ pre- and post-measures of practice and knowledge, indicating improvements in both. Paired sample *t* tests confirmed this, indicating an increase in practice of 0.81 points at the specified  $p < .05$  level,  $t(114) = 4.26$ ,  $p < .001$ , 95% CI [0.43, 1.18], and an increase in knowledge of 0.59 points,  $t(114) = 8.52$ ,  $p < .001$ , 95% CI [0.45, 0.73]. This meant that, on average, practice improved by just under 1 point on the 7-point scale, and that average knowledge improved by just over 0.5 points on the 3-point scale. Paired sample *t* tests using participants’ pre- and post-participation scores on the attitudes toward students with mental health needs scale indicated no significant change, with a mean difference of -0.18 points at the  $p < .05$  level,  $t(118) = -1.29$ ,  $p = .02$ , 95% CI [-0.46, 0.10].

**Figure 5**

*Box Plot Depiction of Participants' Growth in Knowledge and Practice*

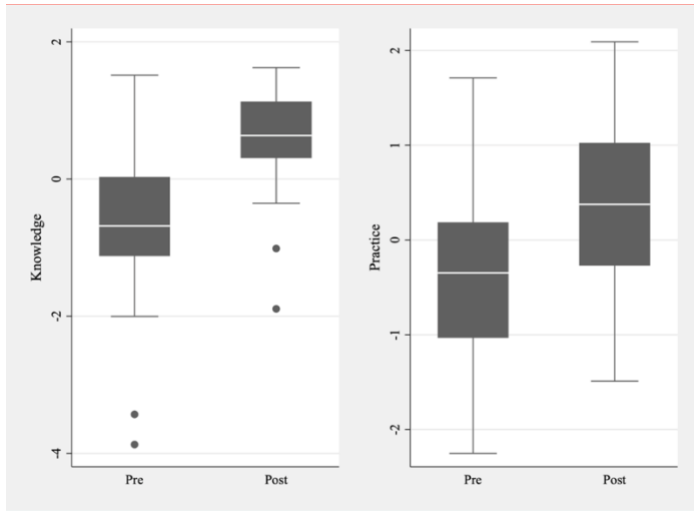
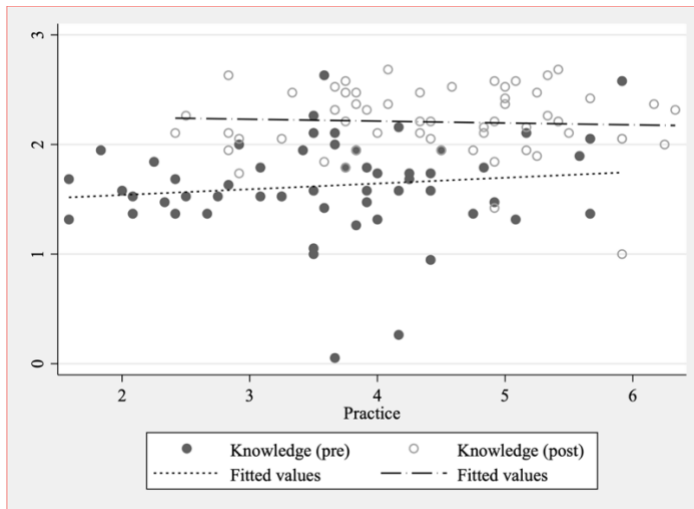


Figure 6 depicts correlations between participants' practice and knowledge at pre- and post-test, indicating a positive association between practice and knowledge at pre-test and a negative association at post-test. This may have indicated that participants improved practice at a higher rate than they increased their knowledge; I continued to explore this finding in the qualitative and convergent analyses.

**Figure 6**

*Scatterplot Depiction: Predicted Change in Knowledge Given Change in Practice*



Participants' practice scores (i.e., CLASS scores) were composed of four domains, and I performed paired sample *t* tests of those domain scores. These tests showed significant growth in

each domain of practice (see Table 4), with the greatest increase in Instructional Support and the smallest in Classroom Organization.

**Table 4**

*Mean CLASS Differences: Pre- to Post-TSG*

CLASS Domain	Mean pre-score	Mean post-score	Mean difference	<i>t</i>	<i>df</i>	Difference 95% CI	<i>p</i> (two-tailed)	Cohen's <i>d</i> effect size
Total score <sup>a</sup>	3.64 (.14)	4.45 (.13)	0.81 (.11)	7.42	57	[1.18, 0.43]	< 0.001*	0.97
Emotional Support	4.07 (.18)	4.81 (.15)	0.74 (.13)	5.62	57	[1.19, 0.28]	< 0.001*	0.75
Classroom Organization	4.90 (.14)	5.44 (.12)	0.54 (.12)	4.44	57	[0.89, 0.17]	< 0.001*	0.58
Instructional Support	2.70 (.15)	3.68 (.16)	0.98 (.12)	7.91	57	[1.41, 0.55]	< 0.001*	1.03
Student Engagement	3.31 (.17)	4.28 (.18)	0.97 (.15)	6.46	57	[1.44, 0.49]	< 0.001*	0.85

*Note.* Standard errors in parenthesis.

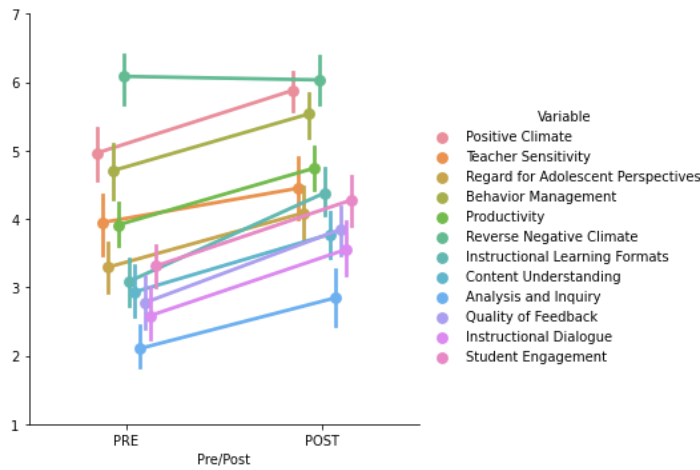
<sup>a</sup> Interpret with caution, as the CLASS is multidimensional and normed by domain

\*  $p < .01$ .

The Emotional Support and Classroom Organization domains were greater than Instructional Support and Student Engagement scores, indicating that participants were more likely to begin with higher skills for building positive relationships with students and structuring consistent classroom environments versus enacting high-quality academic instruction. I further explored participants' growth in practice through analyses of whole-sample scores across the 12 CLASS dimensions, which make up the four domains (see Figure 7). Mean scores improved across each dimension. A few trends emerged. Positive Climate, Negative Climate, and Behavior Management began relatively high, with mean pre-scores ranging from 4.71 ( $SD = 1.53$ ) to 6.03 ( $SD = 1.26$ ). This contrasted with the low mean pre-scores in dimensions probing instructional quality, including Analysis and Inquiry, Quality of Feedback, and Instructional Dialogue, which ranged from 2.10 ( $SD = 1.18$ ) to 2.78 ( $SD = 1.46$ ). This indicated that teachers began participation with more room for growth in these areas.

**Figure 7**

*Sample-Wide Pre-Post CLASS Scores by Dimension*



**Contributors to Change**

To answer research question 1A, regarding the role of knowledge calibration on change in practice, I first examined the knowledge calibration variable by participant; a greater absolute value indicated a greater discrepancy between actual and perceived knowledge. In general, participants were more likely to overestimate their knowledge, however they were more calibrated than past research had suggested (e.g., Voss et al., 2022). I conducted a series of ordinary least squares linear regression models to examine teachers’ growth in practice and the variance attributed to knowledge and calibration in addition to other variables of interest. Model 1 was an unconditional model and provided an intercept depicting the overall mean CLASS change score ( $\beta = .81, SE = .08, t = 10.55, p < .000$ ). In Model 2, I added knowledge at pre-test, which was nonsignificant but indicated that an increase in CLASS was associated with a slightly lower knowledge starting point. Model 3 included change in knowledge from pre- to post-test, and I found that practice increased at a higher rate than knowledge. Model 4 included calibration, which was nonsignificant and appeared to have little effect on change in practice. Finally, in Model 5 I added teaching context, which was nonsignificant (see Table 5).

**Table 5**

*Regression Models*

	Model 1	Model 2	Model 3	Model 4	Model 5
Change in practice	0.81 (.07)***	0.84 (.30)**	1.97 (.56)**	1.89 (.86)*	1.51 (.98)
Knowledge		-0.02 (.18)	-0.50 (.27)	-0.45 (.42)	-0.30 (.44)
Change in knowledge			-0.60 (.25)*	-0.60 (.37)	-0.39 (.38)
Calibration				0.03 (.11)	0.00 (.11)
Pull-out					-0.14 (.31)
Segregated					0.35 (.35)

*Note.* Standard errors in parenthesis; in teaching context, inclusive settings (i.e., coteaching or mixed) is the reference category.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

I also conducted paired-sample  $t$  tests for each teaching context, comparing pre- to post-test means. Participants working in more inclusive settings (i.e., coteaching and mixed) experienced an estimated mean increase in practice of 0.73 points ( $t = 1.65, p = 0.05$ ), and those working in less inclusive settings (i.e., pullout and segregated classes) experienced an estimated 0.83-point mean increase in practice ( $t = 3.87, p < .001$ ).

### **Qualitative Analysis**

I examined features of participation that promoted change and, conversely, those that suggested barriers to enacting critically inclusive pedagogy, and two broad themes emerged: (a) tension between instructional rigor and inclusivity and (b) the salience of expert input and reflection on practice. The first theme described barriers that participants experienced in developing inclusive pedagogical practices, particularly in creating inroads to rigorous, grade-level learning standards. The second theme described aspects of the TSG that supported development of critically inclusive practices, indicating the importance of expert input at opportune moments and consistent practice paired with reflection.

#### ***Tension Between Rigor and Inclusivity***

The qualitative data foregrounded patterns of misunderstanding in the design and implementation of learning experiences that are accessible and focused on rigorous learning objectives. Although the TSG framed critically inclusive instruction as that which empowers students to access learning tools as needed, many teachers struggled to translate this idea to practice. For example, many tended to prescribe fixed scaffolds for all students, stipulating that all with a particular disability label, for example, would be required to use the same support tool. These teachers struggled to shift meta-cognitive decision-making from themselves, as the central authority on learning, to students as emergent authorities on their own learning.

Implementing lessons that were simultaneously rigorous and inclusive remained a challenge for many participants in other ways as well. For example, one teacher shared an academically rigorous lesson plan focused on grade-level standards (i.e., retelling a story with key details and demonstrating understanding of the central message or lesson). The TSG emphasized the design of flexible avenues for students to access content and express learning, however the lesson sequence and assessment plan specified that each student would read a text aloud (i.e., a single avenue to access content despite reading aloud not being the learning objective) and then orally describe the story and related theme in a group discussion (i.e., a single avenue to express understanding). Although the lesson plan held students to grade-level reading standards, rigid requirements for engaging with content and expressing learning left a narrow path for students to traverse toward the learning goals and a risked conflating students' ability to read aloud with their comprehension. This inverse relationship between rigor and inclusivity was common, illustrated as participants decreased lesson rigor while increasing inclusive structures.

Perhaps a step closer to critically inclusive instruction, but still indicative of misunderstanding, teachers also tended to specify strategies or modifications for specific groups of students, essentializing their needs as fixed and grounded in labels. For example, one teacher's lesson plan specified: "Allow ELL students to work in pairs. Shorten the amount of reading they are required to complete. Simplify the language of the directions. Allow them to use a dictionary." Although these accommodations may have benefited some multilingual learners, it is possible that some may not have needed them and, further, that English-only speakers may

have also benefited from them. Further, reducing the quantity of reading in this lesson reflected a reduction in rigor for students classified as English learners, illustrating how some participants struggled to understand student needs as dynamic and variable within and across lessons, a core concept of inclusive design.

In addition, the tension between rigor and inclusivity surfaced in relation to students with mental health needs. Many participants described a conception that operant conditioning and behaviorist strategies (Kazdin & Bootzin, 1972; Skinner, 1966) represented effective teaching practices for students with internalizing mental health conditions (e.g., depression, anxiety). One participant described a student diagnosed with anxiety who struggled with focus, left the classroom to avoid speaking, and experienced somatic symptoms. The teacher shared that they planned to support the student in accessing learning by writing a behavior plan, “so that supports can be added to address his escape-maintained behavior.” Others suggested conducting functional behavior assessments, using token economies, and focusing on “the issue of leaving the room.” Preventing avoidance conditioning is a key principle in effective therapy for anxiety disorders. However, the data—in alignment with other research (e.g., Firestone et al., 2022)—suggested that PSTs tended to default to these approaches, perhaps due to familiarity with behaviorist procedures versus other mental-health-supportive practices (e.g., trauma-informed teaching, psychoeducation). As such, it may be beneficial to frame operant-based approaches as one potential element in integrative models of support for students in preservice learning.

### ***Expert Input and Sustained Reflexivity***

The qualitative analysis also foregrounded participatory experiences that facilitated pedagogical insights and growth in practice, specifically (a) support from an expert facilitator and (b) engagement in iterative cycles of action and reflection. For example, a participant who taught at the middle-school level stated that:

I went back to the lesson I most epically failed, which was in TSG 4. The professor’s overly kind response to [me] was: “What specifically do students need to understand? Once you have that set, think about how you can provide flexibility within the lesson that allows ALL students to meet this goal. What are different choices that they can make in terms of accessing material (e.g., different access points, modes of content delivery), and what are different ways that students could express mastery of the objective?”

The participant then described redesigning the lesson given their new understanding of inclusive pedagogy established through the TSG work:

It is, most certainly, not reserving a critical thinking question for the higher-performing students, a factual comprehension for middle performers, and maybe asking a vocabulary question for lower performers. On the contrary, [it] ensures engagement by allowing each student to use her/his strengths to engage [in] lessons in a way that is meaningful and rewarding.

These data suggested that the iterative revisiting of this topic supported a shift away from reducing rigor (e.g., modifying) toward building flexible inroads to grade-level learning objectives in lesson design.

In addition, as part of the reflective process participants often articulated professional goals, which led to focused work that ultimately resulted in growth. For example, one participant described a desire to incorporate student choice into their lessons. In one TSG session, they reflect on their work toward this goal while describing a science lesson that they had taught:

I am looking for more resources in order to present them with choice. ... I want students to engage the material and I want to offer them different means of expression (through media, written responses) as a means of more equitable and rounded assessment.

The participant then described the flexible ways in which they planned to enhance students' choice in a subsequent lesson on Newton's Laws of Motion. Through iterative rounds of enactment and reflection, this participant developed techniques for constructing flexible inroads for students to meet grade-level physics learning objectives.

Another participant reflected on practice in their description of an English Language Arts lesson they had taught, analyzing the components that they intended to modify in subsequent rounds of enactment:

I would do many things differently if I were to teach this lesson again. ... They struggled staying on topic for the turn and talk. I would model turn and talk. I would talk to one student ahead of time and explain to him what we were going to do. I would then have the students practicing turn and talk on a subject that is of high interest to them praising those that follow the model. I would pick a more appropriate graphic organizer and allow more time to work on this portion of the lesson. It would be helpful if each student had their own copy of the book so they could reference it to remember the sequence of the story. I modeled the character box but realized they do not have a full grasp of the vocabulary that was on the organizer. This is the first time I have tried to do a read aloud. I believe with practice the students will understand the routine and expectations and have more success with the lesson.

Here, the participant evidenced an understanding of teaching as an iterative endeavor, improved through post-implementation reflection and analysis. In addition, their framing suggests that the participant situated students' struggles to achieve learning goals in their (i.e., the teacher's) instructional choices, rather than attributing it to inherent deficits in the students.

### **Data Integration and Interpretation**

In the third phase of analysis, I integrated the quantitative and qualitative findings using joint display analysis. A joint display refers to a table or figure that (a) represents mixed findings, (b) assesses fit between those findings (i.e., expansion, discordance, or confirmation; Fetters et al., 2013), and (c) presents an interpretation, referred to as a *meta-inference* in the mixed methods literature, regarding the meaning generated through the integrated consideration of results (Fetters, 2020; Haynes-Brown & Fetters, 2021). This process of building and developing multiple iterations of joint displays supports new ways of considering, interpreting, and presenting data.

Prioritizing the use of visuals (Guetterman et al., 2021), I first created a series of graphs representing participants' growth-in-practice trajectories, as shown in the quantitative data. To explore patterns regarding variation in growth, I used these visualizations to categorize

participants into two groups: those who did not improve practice (i.e., with a change in CLASS score  $\leq 0$ ) and those who did (i.e., with a change in CLASS score  $> 0$ ). Within each group, I sorted participants into more precise sub-categories (e.g., improved by 1 point vs. 2 points), and I used the sets feature in MAXQDA to explore patterns across codes and categories among these groups. In this way, merging applied an aggregation lens to the qualitative data and a disaggregation lens to the quantitative data. Using this approach, I constructed joint displays for each participant and various participant subgroups, which enhanced understanding (Fetters & Freshwater, 2015) of participants' experiences in relation to their practice. I subsequently describe each of the five meta-inferences generated through the joint display analysis.

### ***Meta-Inference 1: Attitudes Mattered***

Participants' attitudes regarding student deficits and pedagogy (i.e., teacher- versus student-centered instruction) influenced their growth in practice. Specifically, underlying conceptions about student deficits and a reliance on teacher-centered learning appeared to hinder growth for some participants. In contrast, those who exhibited growth in practice tended to frame their instructional choices as malleable drivers of student learning and design lessons that centered student perspectives. Figure 8 is the joint display for "Charlie," an early elementary teacher who significantly improved practice across the course of participation. The line graph depicts Charlie's CLASS scores, which increased in all 12 dimensions. Quantitative data indicated that Charlie began with high scores in dimensions related to classroom climate and that these scores increased toward the ceiling by the end of the term. The juxtaposed qualitative data expanded this finding. The first picture in the qualitative column is an artifact that Charlie shared: an "emotional zones" tool designed to support students in self-evaluating their emotional readiness for learning, which Charlie described in a TSG session. The artifact displayed characters from a movie that was popular among Charlie's students and was written in Spanish, as this classroom was an equal-status bilingual setting (i.e., students could use either language). Taken together, these data illustrate a commitment to instruction that centered student interests and linguistic backgrounds.

The graph also indicates that Charlie's scores increased drastically in CLASS dimensions related to instructional support, particularly in Analysis and Inquiry and Regard for Student Perspectives, both of which represent core features of an inclusive, equity-centered practice (Hammond, 2014). During one TSG session, Charlie shared a goal of wanting to increase the inclusion of student voice in content-area lessons. Related growth in practice is evidenced in the second teaching artifact pictured in their joint display's qualitative column: "Classroom 3's strategies for adding," which presented each student's description of their preferred addition strategy. Charlie described this artifact:

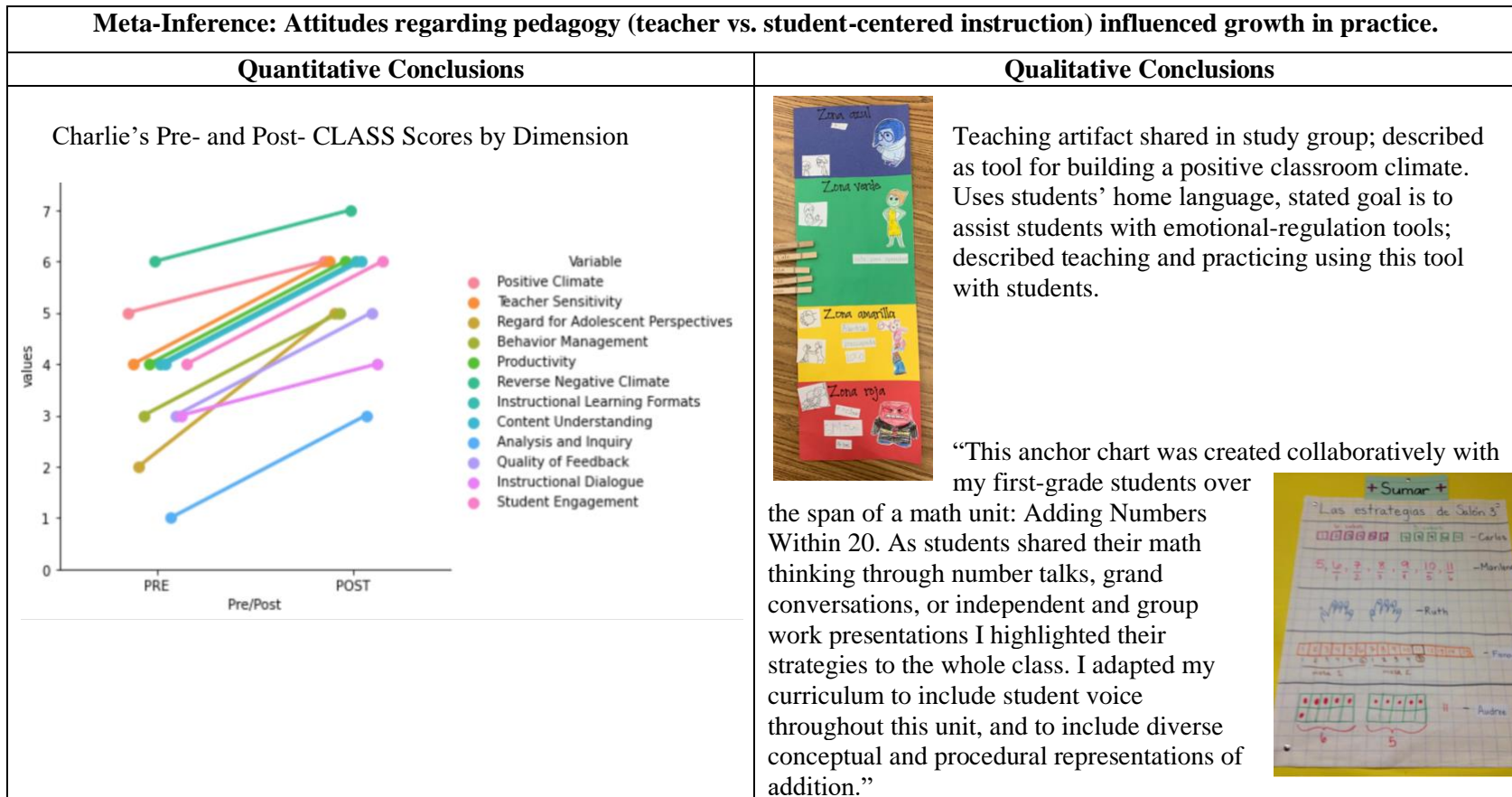
As students shared their math thinking throughout number talks, grand conversations, or independent and group work presentations I highlighted their strategies to the whole class. I adapted my curriculum to include student voice throughout this unit, and to include diverse conceptual and procedural representations of addition.

Thus, the growth displayed in Charlie's quantitative data occurred alongside evidence of valuing student voice and choice in learning. The joint display depicts Charlie's growth as intertwined with their attitudes about student-centered instruction.



**Figure 8**

*Joint Display: “Charlie”*



The joint display analysis also foregrounded attitudinal dispositions that may have prohibited some participants' growth in practice. Figure 9 is a joint display that juxtaposes two participants, each of whom exemplified differential impact on practice and, relatedly, differential attitudes toward students and pedagogy: "Kai" exhibited significant growth in practice, whereas "Angel" did not. These teachers taught in similar contexts; Kai delivered pull-out math instruction to students in grades 4 through 6, and Angel delivered pull-out math instruction to students in grades 7 and 8. Both expressed a professional commitment to improving their students' engagement in learning, which they hoped to work toward through participation in the TSG. However, as shown in the joint display, Angel's CLASS scores did not increase; rather, they maintained in all dimensions except for Student Engagement—in which their score decreased from a 2 to a 1. Meanwhile, Kai's scores increased in almost all dimensions, with particularly notable gains in Quality of Feedback (increasing from a 4 to a 7) and Student Engagement (increasing from a 4 to a 6) on the 7-point scale.

Given that qualitative findings underscored the difficulty that many participants experienced in designing flexible inroads to rigorous learning objectives, I focused on how and why this complexity was surmountable for some participants but not others in the data merging. Figure 9 indicated that underlying attitudes about student deficits and centralized versus distributed learning may have barred Angel's growth in practice. Angel's qualitative data suggested that they may have conflated student engagement with compliance, stating, "It was a successful lesson because ... participation ... was 90%, although I still had to call my students' names in order for them to do their work during the lesson." Angel's data also indicated a belief that lowering instructional rigor was an effective strategy for building engagement among their students, reflecting a lowering of expectations: "I used this matching game because it's fun and easy. Students would look for a match using what they learned earlier. This low-risk activity would increase student engagement because it's doable to them." Finally, Angel tended to attribute lack of engagement to student deficits rather than interpreting it as a prompt to reflect on shortcomings in their instruction. In describing a lesson in which students demonstrated low engagement, they stated: "I don't know what went wrong. The classwork had lecture notes, examples, and audio explanations to help the students complete their work ... I don't know if poor technology, learning disabilities, lack of motivation, or something else is the blame."

In contrast, Kai described a teaching experience in which they also struggled with student engagement:

A challenge during this lesson was maintaining my student's attention, due to the abstract concept and delivery in the form of me basically lecturing, I could tell my students struggled with maintaining the focus they usually have when our lesson is routine.

Alongside Kai's steep increase in their Student Engagement score, their qualitative data suggested that they understood their instructional choices—here, the mode of delivery—as malleable drivers of student engagement, which they defined as students participating "on the edge of their seat" and being "validated when providing full explanations of their thinking."

These varied interpretations of students' disengagement and teaching orientation extended beyond reflections on practice. Angel shared a teaching artifact—depicted in their joint display—from a lesson involving structured groupwork, a focus strategy of the TSG drawn from Complex Instruction. Because Complex Instruction is meant to build student engagement through groupwork, Angel's TSG members recommended that they incorporate it into their

lesson. However, in describing implementation, Angel expressed disappointment that the groupwork did not increase engagement:

Although all group members completed their tasks, they did not talk to each other. ... Interpreting graphs is a challenging task especially for students with low reading and writing skills. Therefore, I had to ask lots of guiding questions. My main concerns are students don't talk to each other and they don't ask questions.

This suggests an attribution of low engagement to student deficits (e.g., not being able to meet the “challenge” of interpreting a graph) rather than interrogating instruction as a mechanism for engagement. In this case, although Angel's lesson placed students in groups, their instruction remained teacher-centered and focused on following a set of pre-determined steps, indicating that Angel had difficulty shifting from a teacher- to a student-directed learning paradigm.

In contrast, Kai conducted a mathematics lesson to help students understand the concepts of area and perimeter. After implementation, Kai reflected on using students' misconceptions to build engagement in the activity. Their joint display includes a quotation and corresponding artifact describing this:

I noticed that my student put the lengths of 7 and 7 together to make the number 77 as opposed to the calculation “ $7 + 7 = 14$ ”. When I demonstrated the student's calculation using a ruler, “77 inches would be two of these yard sticks long, does that sound right?” the student was able to make the corrections following my improvised formula.

Kai framed a student's error as valid and used it as an opportunity to address a misunderstanding through flexible, responsive instruction. This lesson featured high student engagement, perhaps due to Kai's view of students' ability to correct misconceptions and develop conceptual understanding within a flexible approach.

Figure 9

Joint Display: Teachers' Attitudes

Meta-Inference: Attitudes regarding student deficits and pedagogy (teacher vs. student-centered instruction) influenced growth in practice.		
	Angel	Kai
Quantitative Conclusions	<p>Pre- and Post- CLASS Scores by Dimension</p>	<p>Pre- and Post- CLASS Scores by Dimension</p>
Qualitative Conclusions	<p>“My goal this year is to improve student engagement. My TSG plan is to increase student engagement in my SAI Algebra class.”</p> <p><b>Group #1</b></p> <p>“I used this matching game because it’s fun and easy...This low-risk activity would increase student engagement because it’s doable to them.”</p> <p>“My biggest concerns were that the students’ work showed that students didn’t understand the lesson...I don’t know what went wrong. The classwork had lecture notes, examples, and audio explanations to help the students complete their work...I don’t know if poor technology, learning disabilities, lack of motivation, or something else is to blame.”</p> <p>“Although all group members completed their tasks, they did not talk to each other...Interpreting graphs is a challenging task especially for students with low reading and writing skills. Therefore, I had to ask lots of guiding questions.”</p>	<p>“A challenge during this lesson was maintaining my student’s attention, due to the abstract concept and delivery in the form of me basically lecturing, I could tell my students struggled with maintaining the focus they usually have when our lesson is routine and remedial.”</p> <p>“I [used] multiple methods of delivering instruction and practice, such as Base 10 block cubes, writing on the whiteboard, paper and having the students take turns using these mediums to access the curriculum.”</p> <p>“I noticed that my students put the lengths of 7 and 7 together to make the number 77 as opposed to the calculation ‘7 + 7 = 14.’ When I demonstrated the student’s calculation using a ruler, ‘77 inches would be two of these yard sticks long, does that sound right?’ the student was able to make the corrections following my improvised formula.”</p>

55

### ***Meta-Inference 2: Knowledge Calibration Did Not Influence Growth in Practice***

I had hypothesized that teachers' knowledge calibration at pre-test would predict their growth in practice. However, quantitative conclusions indicated that calibration was not a predictor of growth in practice among participants, and no conceptual categories or themes related to calibration emerged through the qualitative analysis, despite working with an a priori code for knowledge calibration. In merging the datasets, I revisited the qualitative data to perform an additional focused analysis on this construct, in which I created three sets of participants based on their knowledge calibration: those who underestimated their knowledge, those who overestimated it, and those who were calibrated. Using MAXQDA's compare cases and groups tool, I examined whether there were discernable differences in codes among these three groups. No relevant patterns emerged. I therefore concluded that the two strands of data confirmed one another in relation to this construct, suggesting that the role of knowledge calibration was minimal enough that teacher educators can probably disregard this element when planning coursework.

### ***Meta-Inference 3: Knowledge and Practice Were Mutually Reinforcing***

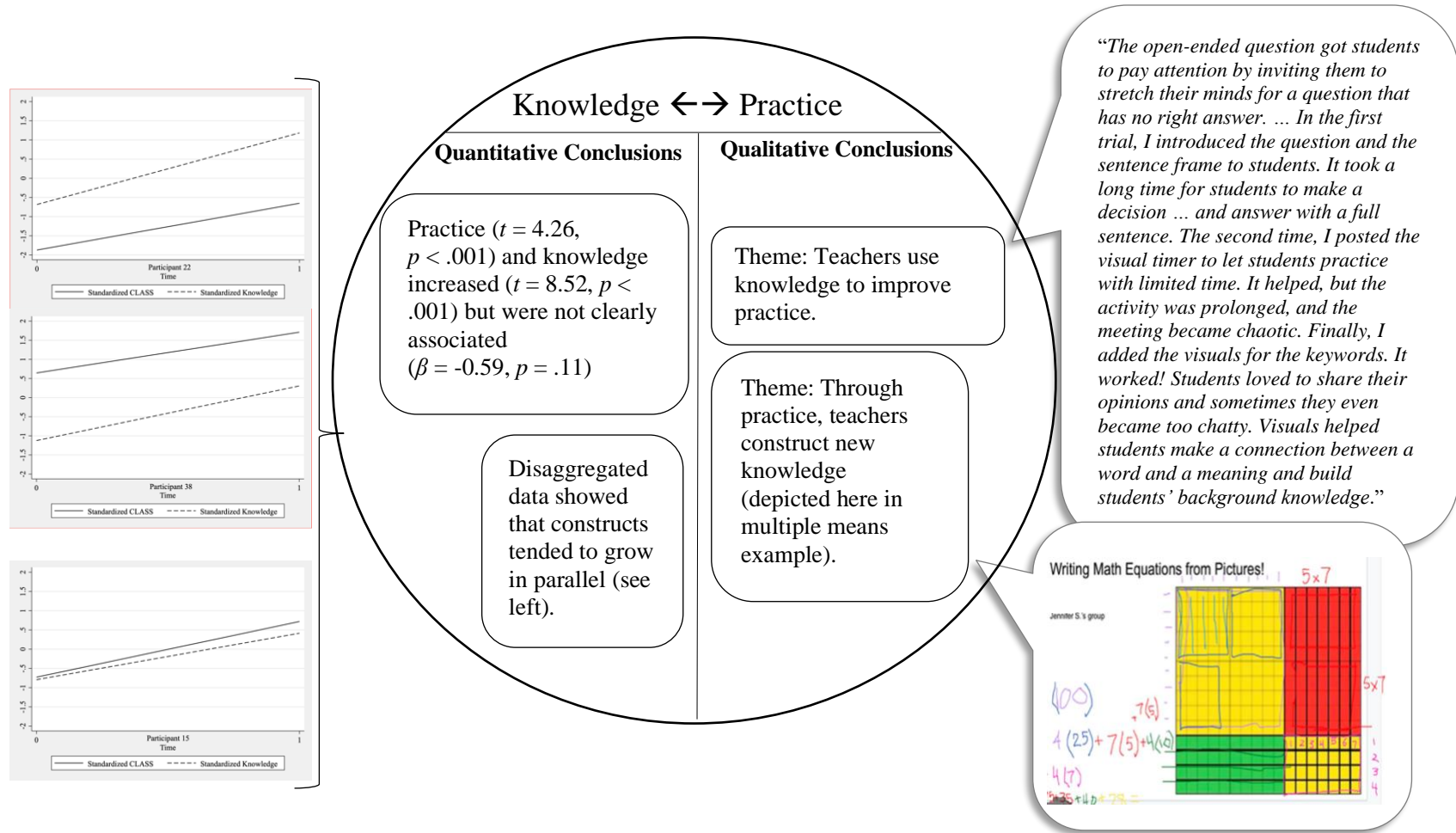
Although participants demonstrated significant growth in both practice and knowledge, quantitative conclusions indicated that growth in knowledge did not meaningfully predict teachers' growth in practice. On average, participants displayed greater growth in practice than in knowledge, indicating a non-linear, heteroskedastic relationship. Data integration expanded this initial finding (see Figure 10). Qualitative conclusions indicated that many participants applied new knowledge to enact related practices. However, it also indicated that successful enactment of new practices bolstered participants' knowledge, suggesting a mutually reinforcing interplay between these two constructs. In this case, data integration resulted in expansion of findings, which led to the third meta-inference: Growth in knowledge and practice are mutually reinforcing processes that occur in tandem.

The circular joint display in Figure 10 substantiates this meta-inference. First, this joint display is circular to indicate that it differs from the previously presented, participant-specific rectangular displays in that it merged the datasets at a higher level of aggregation. As demonstrated in the three participant-specific graphs on the quantitative side, knowledge and practice tended to both grow, often more or less in parallel with one another. The themes and illustrative quotes on qualitative side of the display demonstrate how knowledge appeared to affect practice and, conversely, how practice enhanced knowledge. In the quote exemplifying the former, a teacher described applying techniques learned and practiced in the TSG to their instruction. The second theme and related teaching artifact exemplify the latter. The teacher shared an artifact from a mathematics lesson, depicted at the bottom of the qualitative column, in which they taught a mathematics skill using multiple means of representation, driven by student questions and ideas. They shared this artifact with their TSG, describing how the process of teaching this lesson changed how they think about mathematics instruction: "Moving forward, I'm going to be more flexible and try to let students guide more of the explorations. I didn't expect this lesson to be successful, but they really latched onto it." These two examples illustrated trends across the sample, substantiating the third meta-inference.

**Figure 10**

*Joint Display: Growth in Knowledge*

**Meta-Inference: Knowledge and practice are mutually reinforcing constructs.**



#### ***Meta-Inference 4: Participatory Experiences Facilitated Growth in Practice***

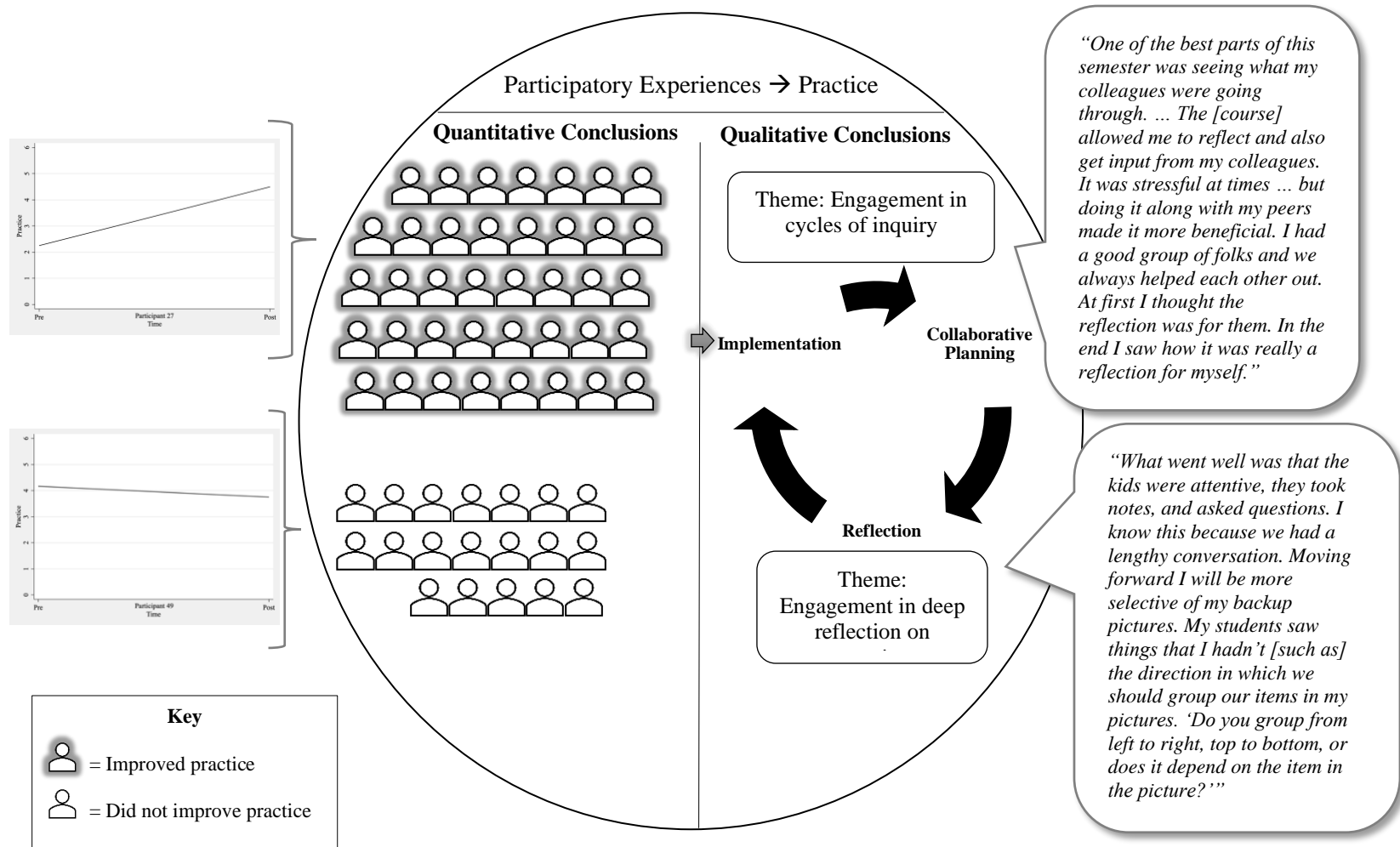
The qualitative data had indicated that some teachers perceived certain participatory experiences to have supported their growth in practice. Data integration expanded this finding, indicating that engagement in iterative cycles of inquiry in collaboration with colleagues—especially the deep reflection on enactment—supported teachers’ growth in practice. In performing the joint display analysis in relation to this finding, I merged data (Figure 11) by disaggregating the quantitative data into subgroups—in this case, those who improved their practice and those who did not. I represented each participant with a graphic icon and applied a glow effect to indicate the number who showed overall growth in practice from pre- to post-participation. Line graphs to the left of each subgroup provide illustrative examples of pre-to post-CLASS scores.

I then compared codes and thematic patterns by these two subgroups in the qualitative data. Comparative analyses indicated that participants who improved practice tended to evidence deep engagement in iterative cycles of inquiry—particularly, reflection on practice. Figure 11 illustrates this, connecting the growth-in-practice subgroup to a visual depiction of inquiry cycles with a small, glowing arrow. The qualitative side of the joint display connects the visual depiction of the instructional inquiry cycle to quotes illustrating each of these themes. In the first, a participant reflected on the value of engaging in iterative cycles of collaboration, implementation, and reflection. They describe the value in “seeing what [their] colleagues were going through,” receiving input from colleagues, and reflecting in collaboration. The second quote is an example of one participant’s reflection on a lesson, in which they described what went well and what they intend to do next time based the experience. Therefore, through this data merging I derived the following meta-inference: Recursive participatory experiences led to maximum growth, and those who experienced the most growth relied on colleagues’ feedback and deep reflection on practice, showcasing the benefit of communities of practice (Wenger, 1998).

**Figure 11**

*Joint Display: Participatory Experiences*

**Meta-Inference: Recursive participatory experiences and reflection facilitate growth.**





### ***Meta-Inference 5: Context Influenced the Impact of Participatory Experiences***

Finally, I also hypothesized that teaching context would predict growth in practice. The quantitative analysis had indicated that context was not a significant predictor, yet the qualitative data indicated discordance between the two sets of findings. Given that I had collapsed participants' teaching context into broad groups (i.e., those working in more inclusive settings and those working in more segregated settings) to maintain sufficient power in the quantitative analysis, in merging I began by more precisely categorizing participants into four teaching-context groups. I then examined patterns within and among those groups to evaluate whether meaningful patterns emerged.

Figure 12 is a joint display representing this merging of the teaching-context data. The left half of the circle depicts each participant, with their teaching contexts represented via four different outline types. For example, a participant icon with a solid line represents one participant whose context was classified as mixed. I again applied a glow effect to depict the number of participants, within each of the four groups, who displayed growth in practice from pre- to post-participation. As the figure illustrates, this visual arrangement demonstrated that 100% of 3 participants in the coteaching group showed growth in practice; in the mixed group, 4 of the 8 participants showed growth in practice; in the pullout group, 19 (63%) did; and in the segregated group, 12 (92%) did.

I then juxtaposed this disaggregated representation of the quantitative data with pertinent qualitative findings, placed on the right side of the display. Three relevant themes emerged through this subgroup-specific qualitative analysis: (a) school-level structures maintained segregated remedial instruction, (b) coteaching dynamics hindered enactment of new practices, and (c) teaching in a space with freedom to innovate supported enactment of high-quality instruction. Figure 12 includes relevant quotes illustrating each of these themes, connected using call-out bubbles. Therefore, merged data substantiated the fifth and final meta-inference: Teaching context facilitated and hindered growth in practice, interacting with participatory experiences. Participants' ability to be reflective and enact new pedagogical techniques were, at times, limited by the classroom setting as determined by their institution. For example, participants described being limited by a co-teacher whose role was to decide what would be taught each day. In these cases, participants were unable to enact new practices despite engagement in reflection and the ongoing cycles of inquiry in their TSGs. Other participants described teaching in schools that expected them to pull students out of class and deliver instruction in a segregated structure; for example, teaching mathematics to a group of students with the same disability label away from their grade-level peers. Conversely, participants who taught in contexts that allowed them to innovate—for example at a school site that allowed them to experiment with different instructional formats in collaboration with a general education teacher—were able to apply their work in the instructional inquiry cycles to a variety of approaches in the classroom. Therefore, merging these qualitative and quantitative conclusions resulted in expansion, represented in the refined theoretical model.

**Figure 12**

*Joint Display: Teaching Context*

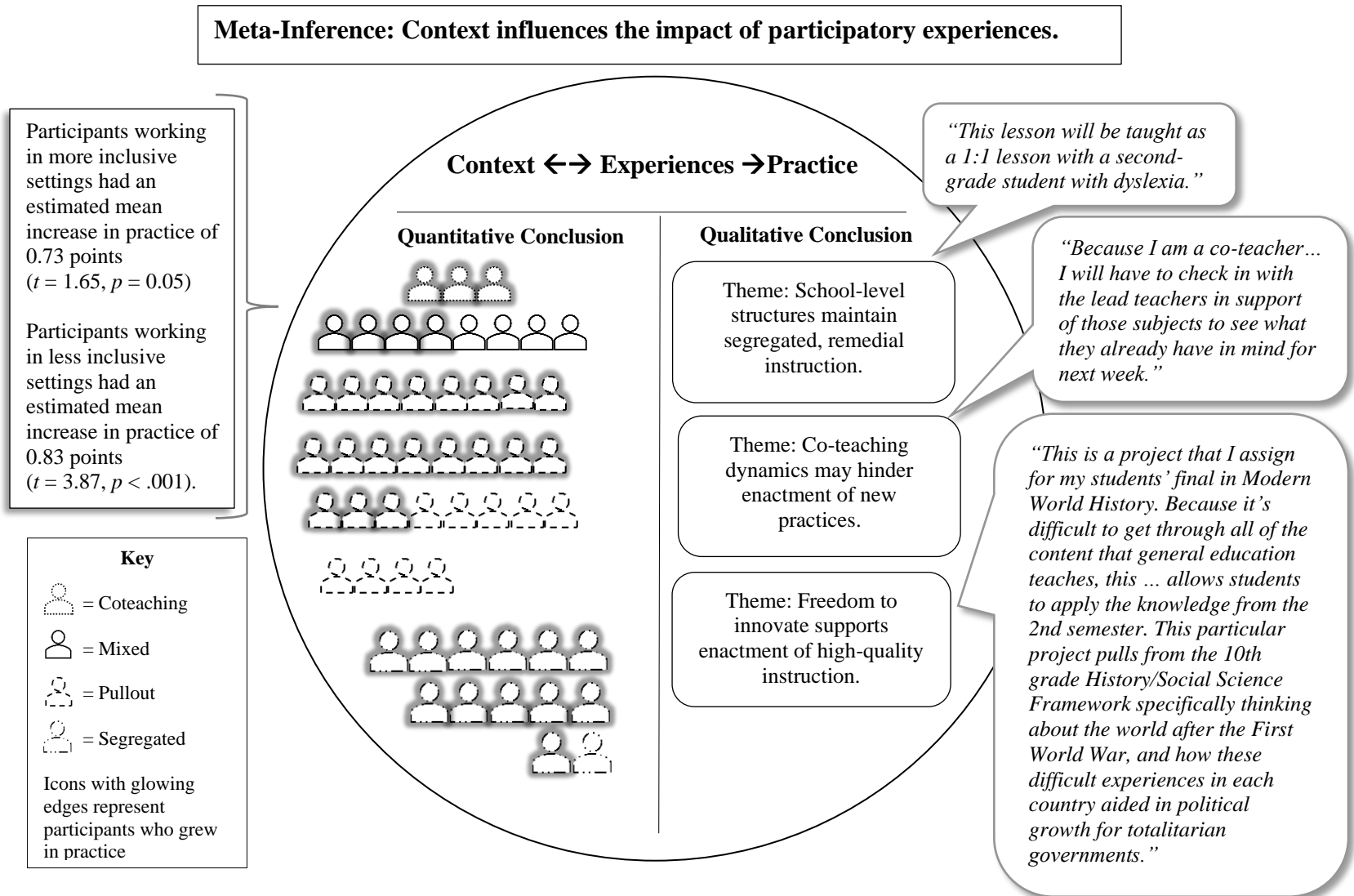


Table 6 displays the full set of meta-inferences generated through the data integration process and the fit between the two datasets identified through the merged analysis.

**Table 6**

*Meta-Inferences Generated Through Joint Display Analysis*

Meta-Inference	Coherence Type
Attitudes regarding student deficits and pedagogy (teacher vs. student-centered instruction) influenced growth in practice.	Expansion
Preservice teachers' knowledge calibration did not affect growth in practice.	Confirmation
Knowledge and practice were mutually reinforcing constructs.	Expansion
Recursive participatory experiences and reflection facilitated growth.	Expansion
Context influenced the impact of participatory experiences.	Discordance

***Quality Considerations for Mixed Methods Research***

In addition to the steps that I took to ensure research integrity in the qualitative and quantitative strands, I applied validity guidelines for mixed methods research to establish additional evidence of integrity. Creswell and Plano Clark (2018) recommended a methods-focused approach to doing so, outlining recommendations based on the type of mixed methods research design. Their framework outlines four types of potential threats to integrity and strategies to minimize the impact of each in a convergent mixed methods study. These include: (a) not using parallel concepts in data collection for the quantitative and qualitative databases. This was not a threat in this research, as I created parallel questions addressing the same concepts (e.g., teachers' practice), and both strands of data built understanding of the constructs of interest. Next, researchers should assess the threat of (b) having unequal sample sizes. This was not a threat in this study, as the samples for the qualitative and quantitative data collection were identical. The next threat to validity in mixed methods research is (c) keeping results from the different databases separate. I addressed this threat through the convergent data analysis integration strategy (i.e., joint display), which I used to systematically merge data and generate meta-inferences. The fourth type of threat to consider is (d) failure to resolve disconfirming results. The parallel analyses did produce one set of disconfirming results—that described in the teaching-context analysis. Creswell and Plano Clark (2018) stated that, to minimize this threat, the researcher should engage in strategies to understand disconfirming results by employing new analyses to make sense of them. This is reflected in the teaching-context subsection of the joint display analysis section. Integrating results through the mixed analysis made sense of these disconfirming data, communicated through the fourth and fifth meta-inferences.

## CHAPTER IV: DISCUSSION

Given that special educators teach students who are marginalized—often, multiply marginalized (Crenshaw, 2017)—within schools, educational equity research must include these teachers and the systems in which they are prepared. Research has indicated that participation in structured, collaborative inquiry supports improvements in teachers’ knowledge and practice (Firestone et al., 2020), and the results of this study suggest that the TSG model can be adapted to function in the preservice context (Myers, 2012), building both technical competence and a reflective disposition toward ongoing professional growth (Zeichner, 2020). Notably, this research provided evidence regarding how TSG participation supported novice teachers’ enactment of equity-centered practices, including the experiences and understandings that led to—or did not lead to—pedagogical improvements.

Quantitative results demonstrated significant improvements across all domains of practice, which included Emotional Support, Classroom Organization, and Instructional Support, in addition to Student Engagement. Although each domain score increased significantly, Instructional Support represented both the lowest mean pre-score and the domain with the greatest growth—a significant finding given the TSGs’ conception of equity-centered pedagogy as grounded in instructional quality. Indeed, participants experienced the greatest improvement in their greatest area of need; namely, in the enactment of learning experiences that build students’ critical thinking in identity-sustaining ways. This represents a significant finding with implications for equity-centered preparation.

Gay (2018) defined culturally sustaining pedagogy as a combination of caring, communication, curriculum, and instruction, yet coursework on diversity often focuses on the first two components without addressing curriculum or instruction. This exemplifies the theory-practice disconnect in teacher education (Kennedy, 1999; 2016), which is particularly troublesome in special educator preparation given these practitioners’ role as instructional experts. As highlighted in Charlie’s case, an equity-centered special education practice can leverage student-centered instruction that sustains cultural, racial, and linguistic identities. Theoretical coursework that emphasizes preservice teachers’ beliefs and attitudes may support positive and compassionate learning environments, but development of an equity-centered practice must build instructional skills that support student learning (Andersen & Stillman, 2013). Otherwise, future special educators will struggle to enact truly inclusive learning experiences that facilitate access to high-quality learning for students across diversity spectra.

In addition, this application of visual joint displays in a convergent research design represents an innovative approach to understanding growth in teachers’ practice and potentially influencing variables. Meta-inferences generated through the convergent analysis indicated that participants’ knowledge calibration at the beginning of the semester was not a meaningful factor in influencing practice, and that teachers’ actual knowledge and practice were mutually reinforcing as teachers engaged in iterative cycles of inquiry focused on inclusive pedagogy. In addition, they indicated that preservice teachers’ attitudes regarding student deficits and instruction influenced the ways in which participants translated TSG content to their practice. Those who tended to reflect on their own instructional decision-making in relation to student challenges made greater improvements in their practice compared to colleagues who pointed toward student shortcomings. Finally, engagement in recursive cycles of instructional improvement and reflection on practice facilitated growth, although context influenced the translation of those salient participatory experiences to practice. Findings foregrounded how

teaching context matters, meaning that preparation programs must seriously consider the schools in which they place preservice teachers for fieldwork.

Multiple individual and institutional factors influence growth in practice, and it is important to acknowledge this tension in offering considerations for teacher preparation that builds capacity in high-quality, inclusive instruction. I situate my findings in a pluralistic conception of causation (Burke Johnson et al., 2017), which motivated the mixed methods approach that I took in pursuit of understanding multiple levels of causation that influenced teachers' practice (e.g., local level in qualitative research, general level in quantitative research). Findings suggested that growth in knowledge, attitudes toward students and the teacher's role, teaching context, and participatory experiences influence instructional quality, and these constructs should therefore be understood as part of a greater causal mosaic. "Causal concepts are like tiles that, put next to one another, and in the right way, will let an image emerge. And the image will be a sophisticated causal theory" (Burke Johnson et al., 2017, p. 144). This research builds needed understanding of these metaphorical tiles, given the troubling dearth of empirical research on preparatory structures that optimize growth in practice during clinical placements (Goldhaber et al., 2022).

Further, McDonald (1992) referred to the underlying connections among learner, teacher, and subject matter as the "wild triangle" three decades ago, and teacher learning for inclusive education remains undertheorized (Waitoller & Artiles, 2013). The data-merging process provided in a more nuanced understanding of preservice teachers' growth in practice than would have been achieved through a mono-method approach (Fetters & Freshwater, 2015), underscoring the importance of applying mixed methods to derive a rich, situational understanding of preservice teachers' practice. Findings indicated that teacher learning is a recursive process—that their knowledge develops in tandem with practice and that growth is perhaps facilitated through participatory experiences, including iterative cycles of planning, action, and reflection. Fieldwork-based courses may support growth in practice by structuring opportunities for teachers to enact new practices and then reflect on that enactment in a cyclical manner. This is distinctly different from seminars in which a professor lectures or feedback structures in which a fieldwork supervisor observes and explains to a candidate what they did right or wrong a few times throughout an academic term. Rather, preservice teachers must learn how to learn from their own practice and act as an agent in their professional development.

### **A Complex Challenge: High Rigor and Universal Inclusion**

My analysis examined participatory experiences in relation to changes in preservice teachers' practice, and the integrated analysis illuminated areas in which the two datasets diverged and complemented one another, expanding insights regarding the quantitative and qualitative findings (Guetterman et al., 2020). Designing lessons that include flexible inroads for all students to achieve rigorous learning standards was challenging for novice teachers. Developing the ability to do so appears to require sustained time, repeated reflection, and consistent input from an expert who can support shifts in preservice teachers' thinking about pedagogy, students, and the role of the teacher. As evidenced in the analysis, many participants struggled to enact lessons that were both rigorous and inclusive of all students, but those who redesigned lessons and applied input from the instructor and colleagues tended to experience insights that supported improvements in practice.

Extending Myer's (2012) conclusion regarding the specific needs of the preservice teacher population, findings also suggest that heightened support was for participants to shift

their practice and analyze attempts at implementation. The analysis foregrounded potentially potent foci around which preservice learning might focus, such as the importance of consistently structuring lessons with multiple means of representation, engagement, and expression that are culturally sustaining. To develop a critically inclusive practice (i.e., accessible, sustaining, and rigorous), PSTs need supported opportunities to experiment with inclusive practices and receive feedback in a collegial learning environment. Without this, inquiry groups run the risk of perpetuating inaccurate understandings. For example, providing “multiple means” was often interpreted as differentiation or modification, which reduced lessons’ rigor and perpetuated disparities in learning opportunities for marginalized students (Bannister, 2016). As depicted in the conceptual framework, I hypothesized that—through a recursive pathway—TSG participation would lead to changes in practice. As Kennedy (2016) noted, “programs that rely on insights recognize the importance of teachers’ in-the-moment decisions and . . . alter those decisions by changing the way teachers interpret classroom situations in the moment and thus, how they respond to them” (p. 956). Our data indicated key points at which the TSG supported such insights, underscoring the importance of expert input in growth-in-practice models for learning. Future work should examine methods for supporting PSTs in constructing and applying these foundational understandings.

### **Locus of Control and Deficit Perspectives**

The transformational processes that emerged for some participants suggested a shift in thinking about learning as the work of the teacher—delivering content to students for absorption (Freire, 1996)—to understanding learning as the work of the student, for which the teacher must create optimal conditions. As one participant reflected:

I have grown as a teacher by learning how to slowly let go of “hand holding” for these students. When the school year started, I felt like I was dragging them along to complete their assignments and sometimes handing them the answers on a silver platter. I have recognized that this is not beneficial for students in the long run and that I want to focus on guiding them towards resources to help them find the answers. I’m there to support them if they are not able to access the curriculum and find strategies and tools that work for them that they can practice using for the rest of their education.

I also identified barriers to growth, including deficit assumptions about students and misconceptions about their engagement in learning. In Angel’s case, deficit framing (e.g., students’ intrinsic motivation) may have barred insights and, thus, changes in practice. Prompting PSTs to reframe teaching problems, from inherent in students to rooted in the opportunities afforded to students, may support engagement in cycles of inquiry that leads toward growth in practice. However, this shift is difficult to catalyze; perhaps especially in the context of special education, which remains grounded in medicalized and rehabilitative conceptions of “smartness” and “goodness” (Leonardo & Broderick, 2011; Maroto et al., 2019) that justify segregation and remediation. Participants who evidenced a teacher-centered view of instruction and/or deficit perspectives struggled to allow students to explore, discover, and make decisions. Angel, for example, consistently underestimated their own power to affect change in students’ learning. Pushing teachers to recognize the impact of their instruction, arguably the most malleable aspect of the classroom, is imperative in building equity for marginalized students.

Moreover, despite the TSGs' focus on designing multiple pathways to learning, difficulty relinquishing control of how students should learn (e.g., allowing students to evaluate how they might best express learning) may have barred enactment of critically inclusive practices. Kennedy (1999) described the problem of enactment, in which teachers learn and espouse an idea while continuing to enact a conflicting practice out of habit, without noticing the contradiction. The tension between the TSG work and teachers' practice reflects this tension, embedded in the special education field's problem of enactment, simultaneously espousing ideas of inclusion while remaining entrenched in behaviorism, decontextualized instruction, and teacher-centeredness. Preparing special education teachers to enact equity-centered practices requires supporting their ability to empower students as learners and relinquish some instructional control. Realizing this philosophical shift will only occur with a larger, systemic reckoning regarding how special education policies, discourses, and practices perpetuate deficit conceptions of students placed in special education.

### **Contribution to the Field of Mixed Methods Research**

This study offers novel contributions to mixed methods research as well. First, it expands the small body of work that has applied mixed methods to develop and substantiate a conceptual framework (e.g., Haynes-Brown, 2022; Millien et al., 2021), offering a replicable process for doing so in a convergent research design. This has broad potential applicability for mixed methods research, in which convergent designs remain common (Guetterman et al., 2021). Although convergent studies lack the iterative capacity embedded in sequential mixed methods approaches, developing, substantiating, and refining a conceptual framework within a convergent research design is a cyclical endeavor. Whereas sequential approaches allow for refinement of theory between phases of data collection, the recursive practice of refinement in a convergent design lies in the data integration phase. This study illustrated an approach to building understanding of complex constructs and their interactions, and it may serve as a model for researchers seeking to build theories that can influence policies and processes across disciplines.

Second, I applied Guetterman et al.'s recommendations regarding the integration of visuals into joint displays. In their review, they noted three gaps in the extant literature: (a) consistency of aggregation in presenting quantitative and qualitative findings, (b) use of visuals to present qualitative conclusions in joint displays, and (c) few examples of how visuals can be used with theory. Therefore, throughout the analytic process I continuously evaluated whether joint displays presented qualitative and quantitative data at comparable levels of aggregation. Guetterman et al. noted that joint displays often present qualitative data on the individual datum level, with quotations, juxtaposed with quantitative data at higher levels of aggregation (e.g., graphs). In traditional quantitative research, priority is given to inferential effect sizes and aggregated results. However, in merging the data I found that disaggregating quantitative metrics was an important step in understanding the full data corpus. I did so through the centering of qualitative themes on the right side of joint displays to represent findings at a similar level of aggregation to the quantitative visuals and related statistics, an important step in ensuring the accuracy and quality of the meta-inferences generated through the integration process.

I also prioritized the use of visuals to support integration, understanding, and interpretation. From the quantitative strand, I foregrounded graphical displays, as "graphs can communicate more information than statistical numbers" (Guetterman et al., 2021, p. 1), and graphic icons with varied shading, outlining, and visual effects communicated frequencies and patterns among various subgroups. Similarly, on the qualitative side of the displays, I

incorporated pictures and diagrams to represent findings when possible. These steps resulted in joint displays that showcased the limitations of both statistical inference and qualitative thematic analysis as singular methods for understanding the highly complex pathway through which novice teachers grow in practice.

This approach illustrated the transformation of empirical data to substantiate the theoretical framework, explaining “how and why a phenomenon operates as it does within the local context” (Haynes-Brown, 2022, p. 3). Many of my analytic decisions began by disaggregating quantitative data in a variety of ways, for example sorting participants into flexible subgroups, often with fewer participants than would be acceptable in performing regressions. These enhanced granular analyses in the quantitative strand supported qualitative analyses at higher levels of focused aggregation. For example, sorting participants based on their teaching context led us to notice differences in the proportion of participants within each group that grew in practice. Through this noticing, I then revisited the qualitative data, categorizing codes by subgroup to identify themes on a comparable level of aggregation. This qualitative analysis would not have occurred without the granular visualization of sorted quantitative data, which, in turn, would not have occurred without moving beyond traditional quantitative analyses. Thus, in a convergent parallel design, data merging is a recursive process in which researchers must continuously return to each dataset to incorporate new themes and conclusions prior to generating meta-inferences.

## **Limitations**

This study has several limitations, the first of which relates to the instrument used to measure teachers’ practice. The CLASS is a general measure of practice that was not directly aligned with the TSG scope and sequence, but rather represented a holistic measure of instructional quality; an instrument tailored to the TSG content may have yielded different results (Ruiz-Primo et al., 2002). However, the CLASS aligned with the TSGs’ equity focus, as it probes the quality of teacher-student interactions and features of positive, motivating, and cognitively challenging classrooms (Gregory et al., 2016). Given this, it is encouraging that results demonstrated growth across the CLASS domains, particularly in Instructional Support. In addition, growth-in-practice scores were based on only two teaching observations—one at the beginning and one at the end of participation. It is possible that these observations did not fully represent teachers’ day-to-day practice, as teachers knew that they were being recorded and this may have affected their actions either positively or negatively.

Further, these data do not establish a causal relationship between TSG participation and changes in teachers’ practice. Rather, the mixed methods approach uncovered patterns of improvement and detailed granular aspects of how changes occurred in relation to the conceptual framework. One limitation of mixed methods research, evidenced in this study, lies in defining a proper sample size. My sample size ( $N = 60$ ) limited the ability to run inferential statistics while maintaining acceptable power. However, larger sample sizes could potentially dilute the power of the qualitative analysis and complicate the full visual analysis of disaggregated quantitative data. Finally, I implemented this study in one traditional teacher preparation program in the Western United States. Findings may provide justification for future, multisite randomized trials that can establish direct causality with a large sample. Rather than using nationally representative data, the use of a single location supported a deep, case-based analysis. This provided a multidimensional understanding of preservice teachers’ growth over time, but such an approach



does not prioritize generalizability, and findings may differ in other locations or with those enrolled in alternative preparation programs.

## **Conclusion**

The extant research on teacher learning has been critiqued as fragmented in focus, fixated on structures rather than underlying processes of professional learning, and lacking a common conceptual framework. Scholars have pointed to the numerous largescale randomized controlled trials—costing many millions of dollars—that have investigated the impact of specific learning models on teachers’ knowledge and practice, which have resulted in null or largely null findings (e.g., Buysse et al., 2010; Gersten et al., 2010; Santagata et al., 2011). As collaborative inquiry models continue to be applied across the field of education, it is critical to examine, refine, and build theory regarding how these models affect PSTs’ practice. “Education research is at a stage in which we have strong theories of *student* learning, but we do not have well-developed ideas about *teacher* learning, nor about how to help teachers incorporate new ideas into their ongoing systems of practice” (Kennedy, 2016, p. 29).

Results indicated that participation in the TSG fostered critical reflection and an iterative approach to practice, and that—through supported opportunities to learn from practice—preservice teachers can develop the ability to select meaningful content, design and implement learning opportunities aligned with valued outcomes, and connect learning to students’ lived experiences. However, findings also indicated that development of equity-centered pedagogy is a dynamic process (Hammerness et al., 2005). Thus, providing supported opportunities to engage in such reflective experiences is essential in developing an intellectual foundation for ongoing equity-focused learning (Cochran-Smith, 2020). As Cochran-Smith et al. (2016) noted, “The ultimate goal . . . is to prepare teachers who challenge inequities by enacting practice that promotes marginalized students’ learning and by working with others as advocates for enhancing students’ life chances” (p. 69). However, though shifting preservice teachers’ practice is critical, educational equity work must also dismantle the intersecting forms of exclusion, oppression, and erasure that marginalize students from high-quality learning opportunities across the educational ecosystem (Annamma & Handy, 2020). Future scholarship must push to disrupt the systems that pathologize students’ abilities and justify segregation and exclusion, and this will require transcending the special-general education binary in teacher preparation and beyond. On this topic, there is much work to be done, and special educators must play a role in this process.

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## APPENDIX A

### Teacher Knowledge of HLPs Instrument<sup>2</sup>

#### Assessment Protocol

The following questions will ask you about various aspects of being a special education teacher. A few of these questions are open-ended. To answer the open-ended questions, please respond as briefly as possible (e.g., with a list, bullets, etc.).

1. Below are three parts of an explicit instruction lesson: opening, body, and closing. Within each, list a few instructional practices that should occur in that portion of the lesson.

*If you don't know, please write "None."*

	Specific instructional practices
Opening	
Body	
Closing	

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<sup>2</sup> Teacher Knowledge of High-Leverage Practices: Assessment Protocol and Scoring Guide © 2021 by Allison R. Firestone, Corrine M. Aramburo, & Rebecca A. Cruz is licensed under CC BY-NC 4.0. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/>



2. Which of the following are examples of cognitive or metacognitive strategies? (select “yes” if it is a cognitive or metacognitive strategy, “no” if it is not, or “I’m not sure”)

	Yes	No	I'm not sure
Developing personal learning goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing how to work with a peer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monitoring one's attention to a task	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using note-taking strategies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using a set of steps to solve word problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explicitly discussing classroom expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using pre-reading and annotating strategies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Redirecting a student's attention to a task whenever they lose focus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching study skills by having students quietly copy down homework from the board into a personal planner each day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Please select all examples of effective student-grouping strategies: (select all appropriate answers). *If you don't know, please ONLY select "I don't know."*

- Creating positive interdependence within groups
- Holding individual students accountable for work production
- Using mixed-ability groups
- Using homogeneous groups
- Maintaining groups for a pre-determined amount of time
- Only using groups for practice with previously learned skills and strategies
- I don't know

4. What are some strategies that promote student engagement?  
*If you don't know, please write "None."*

---

5. A teacher gives the following feedback: "Wow, Diana! You're so good at math. You got all of these multiplication problems correct."

How could this feedback be made more effective? *If you don't know, please write "None."*

---

6. Intensive instruction is equivalent to Tier 3 intervention in a multi-tiered system of supports (e.g., PBIS, RTI, MTSS).

- True
- False
- I don't know

7. Using curriculum-based measures (CBMs) to evaluate student learning has a positive impact on student outcomes, no matter the subject area.

- True
- False
- I don't know

8. Which of the following sources do you know how to use to develop an understanding of a student's strengths and needs? Select "yes" if you know how to use it, and select "no" if you're not sure or don't know how to use it. Next to each of which you select "yes," list a few examples of that type of assessment that you know how to use.

*If you don't know, please write "None."*

Source of Information		If YES:
Yes	No	What are examples of this that you know how to use?

Formal assessments	<input type="radio"/>	<input type="radio"/>	
Informal assessments	<input type="radio"/>	<input type="radio"/>	
Student voice	<input type="radio"/>	<input type="radio"/>	
Family perspective	<input type="radio"/>	<input type="radio"/>	

9. It is important to establish a continuum of strategies to respond to inappropriate behavior. Please select all of the following that are effective strategies to use in a such a continuum. (select all appropriate answers). *If you don't know, please ONLY select "I don't know."*

- Behavioral reminder
- Academic adjustment
- Environmental adjustment
- Warning
- Time out
- Response cost
- I don't know

10. As part of a team evaluation of a student, the special education teacher collects direct observation data on a student's disruptive behaviors in the fifth-grade general education classroom. She collects the following data in two 20-minute observations:

- 15 instances of disruption
- All occurred when student was in close proximity to teacher
- Most were followed by some type of teacher response

Given this limited information, please select all of the following that would be appropriate to consider when creating a Behavior Support Plan (BSP)/Behavior Intervention Plan (BIP) for this student. (select all appropriate answers) *If you don't know, please ONLY select "I don't know."*

- The student is motivated by teacher attention
- The student is motivated by gaining control over the classroom
- The student should be taught a replacement behavior that gains attention in an appropriate way
- The student should be seated far from the teacher to minimize opportunities to disrupt
- The student should be given classwork that she can complete independently without needing the teacher's attention
- The teacher should employ planned ignoring
- I don't know

11. Special educators often collaborate with other professionals—such as general educators, administrators, other service providers—during instructional decision-making meetings (e.g., grade-level data/RTI meetings, meetings with paraprofessionals). Please select all steps that a special educator could take to lead effective meetings with other professionals. (select all appropriate answers). *If you don't know, please ONLY select "I don't know."*

- Understand various types of student data
- Analyze and chart student data
- Apply instructional decision-making processes
- Request that all team members bring specific data to the meeting
- Have the special education teacher track all interventions leading up to the meeting
- Avoid adhering to an agenda to allow other professionals to bring up critical instructional topics
- I don't know

12. Leading effective IEP meetings is a critical part of being a special education teacher. Please select the strategy that would be most helpful in leading a collaborative IEP meeting. (select one) *If you don't know, please select "I don't know."*

- Ensure that no conflicts arise during the meeting
- Assign tasks (e.g., note taking) for each IEP team member to complete during the meeting
- Create an agenda that gives each IEP team member a set amount of time to present information to the team and ask questions
- Listen actively to all IEP team members to clarify and record contributions, ideas, and opinions during the meeting
- None of these would lead to collaborative meetings
- I don't know

13. Collaborating with families is an important part of being a special education teacher. Please select all of the following that should be used when collaborating with families to support student learning and secure needed services. (select all appropriate answers) *If you don't know, please select ONLY "I don't know."*

- Speak with families on a continuous basis about their values, priorities, and concerns for the child's education
- Audio record all conversations with parents and guardians
- Share student data with families and explain the purpose of assessments
- Provide resources to families based on their needs and concerns
- In conversations about a student's progress, emphasize areas in which the student is struggling
- Reduce educational jargon and use straightforward terminology
- I don't know

14. Imagine that one of your students participates in an inclusive setting for writing. The general education teacher has set the following objective for the class: "Students will write a paragraph." As the special education teacher, you would like to adapt this objective into an individualized learning goal for your student. Please write, "Students will write a paragraph," as you believe it should be adapted into an individualized learning goal:  
*If you don't know, please write "None."*

---

15. A special education teacher designed the following individualized learning goal for a student: “Given independent work during math, Shelby will decrease her time out of seat by at least 25 percent.” Please select all components that are missing from this individualized learning goal. (select all appropriate answers) *If you don’t know, please ONLY select “I don’t know.”*

- An antecedent condition/context
- Conspicuous behavior
- Being positively stated
- Being high reaching
- Specifying mastery criteria
- Justification for the goal
- I don’t know

16. Now, please rewrite the individualized learning goal, “Given independent work during math, Shelby will decrease her time out of seat by at least 25 percent,” as you believe it should be written:

*If you don’t know, please write “None.”*

---

17. Setting appropriate instructional goals is critical for student success. Please select all components that a special education teacher should consider when identifying an appropriate goal for a student. (select all appropriate answers) *If you don’t know, please ONLY select “I don’t know.”*

- Grade-level standards determined by local, state, and federal agencies
- Individual learning priorities
- Content and skill priorities within academic disciplines
- Student behavioral challenges
- Promoting higher-level thinking skills
- Goals already created in the district’s IEP software
- I don’t know

18. Please select all of the following that are effective strategies for adapting curriculum tasks and materials to make learning accessible for a range of learners. (select all appropriate answers) *If you don't know, please ONLY select "I don't know."*

- Simplifying task directions
- Finding ways to help students access difficult material
- Altering the amount of material provided to students
- Highlighting relevant information
- Using a lower grade level of content area curriculum (e.g., science, social studies)
- Assigning a one-on-one aide to sit with a student during the whole class period
- I don't know

19. Teachers who use scaffolded supports should be guided by which of the following principles? (select all appropriate answers). *If you don't know, please ONLY select "I don't know."*

- Dynamic assessment
- Knowledge of curriculum
- Student motivation, purpose, and engagement
- Varying levels of support based on a student's learning zone
- Not allowing the student to realize that the teacher is providing support
- Acceptable supports specified in the curriculum being used
- I don't know

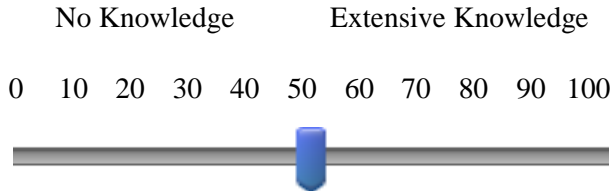


## APPENDIX B

### Perceived Knowledge Instrument

Please rate your level of knowledge of each of the following practices using the sliding tool.

(0 = *limited or no knowledge* and 100 = *extensive knowledge*)



- 1: Collaborating with colleagues to increase student success
- 2: Leading effective meetings with professionals and families
- 3: Collaborating with families to support student learning and secure needed services
- 4: Using multiple sources of information to develop a comprehensive understanding of a student's strengths and needs
- 5: Interpreting and communicating assessment information with stakeholders to collaboratively design and implement educational programs
- 6: Using student assessment data, analyzing instructional practices, and making necessary adjustments that improve student learning
- 7: Create a consistent, organized, respectful learning environment
- 8: Using feedback to improve student outcomes
- 9: Teaching social skills
- 10: Conducting Functional Behavior Assessments (FBAs) to develop individualized behavior support plans
- 11: Identifying and prioritizing long- and short-term learning goals
- 12: Systematically designing instruction toward a specific learning goal
- 13: Adapting curriculum tasks and materials for specific learning goals
- 14: Teaching cognitive and metacognitive strategies to support learning and independence
- 15: Providing scaffolded supports
- 16: Using explicit instruction
- 17: Using flexible grouping
- 18: Using strategies to promote active student engagement
- 19: Using assistive and instructional technologies
- 20: Providing intensive instruction
- 21: Teaching students to maintain and generalize new learning across time and settings
- 22: Providing positive and corrective feedback

## APPENDIX C

### Day's Mental Illness Stigma Scale

Participants were randomly directed to one of four versions of the questionnaire, each describing a different condition. Of the four, three opened with a paragraph that briefly described the symptoms of depression, bipolar disorder, or schizophrenia, and the fourth described mental illness in general (see below.) The wording of the items under each condition was tailored to correspond with the condition described but otherwise covered the same topic. For example, in the mental illness condition, the first item read: "There are effective medications for mental illnesses that allow students to return to normal and productive lives," and in the depression condition that same item read: "There are effective medications for depression that allow students to return to normal and productive lives."

#### **Mental Illness Condition**

*Please read the following paragraph about mental illnesses.*

Mental illnesses have been found to exist throughout history and across cultures. For example, accounts of people with mental illnesses can be found in the Old Testament of the Bible. Ancient Greek and Roman philosophers and physicians, including Hippocrates, Plato, and Aristotle, sought to explain mental illnesses, their causes, and to develop appropriate treatments for these illnesses. Today, many theories of and treatments for these illnesses exist, each generating their own lines of research. There is also evidence that mental illnesses are recognized across different cultures and that very similar cross-cultural descriptions of the symptoms exist. In one cross-cultural study that examined descriptions of mental illnesses, very similar descriptions were found across the countries of China (Taiwan), Colombia, the Czech Republic, Denmark, India, Nigeria, the United Kingdom, the United States, and Russia.

We are interested in your opinions about mental illness and students with mental illnesses in general. Please indicate the extent to which you agree or disagree with the statements listed below using the following scale.

#### **Depression Condition**

*Please read the following paragraph about depression.*

Depression is an illness with symptoms that include feelings of sadness and gloom. People with depression lose pleasure and interest in their usual activities, such as work, friends, and hobbies. A loss or increase in appetite and a lack of interest in sex can often occur. People with depression might cry for long periods of time, listen to sad music, watch sad movies, or sleep for days on end. Some might even lose interest in living altogether and entertain thoughts of suicide. People with depression might become less active and might even move and talk more slowly. Other common symptoms of depression include feelings of guilt, inadequacy, helplessness, and hopelessness about the future.

We are interested in your opinions about depression and students with depression in general. Please indicate the extent to which you agree or disagree with the statements listed below using the following scale.

#### **Bipolar Condition**

*Please read the following paragraph about bipolar disorder.*

Bipolar disorder is an illness with symptoms that include alternating episodes of low and high moods. During a low mood episode, people with bipolar disorder lose pleasure and interest in their usual

activities, such as work, friends, food, and sex. They might become less active and might even move and talk more slowly. Other common symptoms of a low mood episode of bipolar disorder include feelings of guilt, inadequacy, helplessness, and hopelessness about the future. During a high mood episode of bipolar disorder, these same people experience powerful emotions of joy and well-being or irritability and anger. They become energetic, moving and talking rapidly, and might remain active for several days without sleep. During a high mood episode of bipolar disorder, people might also exhibit poor judgment, such as going on buying sprees or engaging in promiscuous sex. We are interested in your opinions about bipolar disorder and students with bipolar disorder in general.

### **Schizophrenia Condition**

*Please read the following paragraph about schizophrenia.*

Schizophrenia is an illness with symptoms that include delusional thinking (ideas that are believed to be true but have no basis in reality). For example, people with schizophrenia might believe that they are being persecuted by others (e.g., someone is poisoning their food) or that ordinary events have special meaning for them (e.g., the television is speaking directly to them). People with schizophrenia might believe that they are important or powerful people (e.g., the President of the United States or Jesus Christ), or that others are controlling their thoughts, feelings, and behavior. Hallucinations are a predominant feature of schizophrenia that might occur in a number of forms. For example, people might hear sounds or voices that don't really exist or see events that aren't really occurring. Other common symptoms of schizophrenia include a lack of emotional expression, feelings of apathy, lack of energy, lack of interest in usual activities, and social withdrawal. We are interested in your opinions about schizophrenia and students with schizophrenia in general.

Items	1 (completely disagree)	2	3	4	5	6	7 (completely agree)
There are effective medications for mental illnesses that allow students to return to normal and productive lives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't think that it is possible to have a normal relationship with a student with a mental illness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would find it difficult to trust a student with a mental illness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students with mental illnesses tend to neglect their appearance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It would be difficult to have a meaningful student-teacher relationship with a student with a mental illness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel anxious and uncomfortable when I'm around a student with a mental illness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy for me to recognize the symptoms of mental illnesses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are no effective treatments for mental illnesses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I probably wouldn't know that a student has a mental illness unless I was told.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A student-teacher relationship with a student with mental illness would be like living on an emotional roller coaster.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

There is little that can be done to control the symptoms of mental illness.

I think that teaching a student with a mental illness would be too demanding.

Once a student has developed a mental illness, he or she will never be able to fully recover from it.

Students with mental illnesses ignore their hygiene, such as bathing and using deodorant.

Mental illnesses prevent people from having normal relationships with others.

I tend to feel anxious and nervous when I am around a student with a mental illness.

When talking to a student with a mental illness, I worry that I might say something that will upset him or her.

I can tell that a student has a mental illness by the way he or she acts.

People with mental illnesses do not groom themselves properly.

Students with mental illnesses will remain ill for the rest of their lives.

I don't think that I can really relax and be myself when I'm around someone with a mental illness.

When I am around a student with a mental illness I worry that he or she might harm me physically.

Psychiatrists and psychologists have the knowledge and skills needed to effectively treat mental illnesses.

I would feel unsure about what to say or do if I were around a student with a mental illness.

I feel nervous and uneasy when I'm near a student with a mental illness.

I can tell that a student has a mental illness by the way he or she talks.

People with mental illnesses need to take better care of their grooming (bath, clean teeth, use deodorant).

Mental health professionals, such as psychiatrists and psychologists, can provide effective treatments for mental illnesses.