

Supporting Elementary Education Teacher Candidates' Knowledge and Implementation of Equity-based Practices

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Abstract: In this article the authors examine elementary education teacher candidates' reflections while participating in a senior course that included a book study on equity-based teaching and an intensive clinical practice experience which included teaching mathematics small groups. Findings indicate that candidates started to make progress towards implementing equity-based practices during their teaching. Their reflections from both the book study and their clinical experience indicated that candidates valued learning about equity-based teaching and were concerned about how to enact those practices while also teaching their required state standards and district-mandated resources.

KEYWORDS: clinical practice, educator preparation, equity, mathematics education, Professional Development Schools, PDSs, school-university partnerships, teacher education

NAPDS REVISED NINE ESSENTIALS ADDRESSED:

Essential 1: A professional development school (PDS) is a learning community guided by a comprehensive, articulated mission that is broader than the goals of any single partner, and that aims to advance equity, antiracism, and social justice within and among schools, colleges/universities, and their respective community and professional partners.

Essential 2: A PDS embraces the preparation of educators through clinical practice.

Essential 3: A PDS is a context for continuous professional learning and leading for all participants, guided by need and a spirit and practice of inquiry.

Essential 4: A PDS makes a shared commitment to reflective practice, responsive innovation, and generative knowledge.

The Need for Teacher Education to Focus on Equity-Based Practices

It is critical for teacher education programs to critically self-examine their courses and clinical practice experiences that their teacher candidates participate in with a focus on developing the skills and knowledge related to using equity-based and culturally sustaining teaching practices (Polly, 2021; Miller & Glass, 2018; Paris, 2012 Paris & Alim, 2017). This is especially true for teacher candidates who identify as Caucasian students who end up obtaining jobs in schools with a large percentage of students who have a different race or ethnicity than themselves (Miller & Glass, 2018).

In the context of Professional Development Schools and school-university partnerships, these constructs have long been grounded in the notion that these mutually beneficial collaborations are intended to increase access and opportunities for students whose demographic groups have been historically marginalized (Polly et al., 2019). Further, recent recommendations from the National Association of Professional Development Schools (NAPDS, 2021) and the American Association of the Council of Teacher Education (AACTE, 2018) call for partnerships that support teacher candidates' clinical practice to prepare candidates for all contexts, especially in settings with students who are experiencing poverty (Garin et al., 2018; Polly et al., 2019).

This exploratory research study examined teacher candidates' experiences and perceptions of two specific course activities intentionally designed to develop candidates' skills and knowledge related to equity-based teaching practices while embedded in an intensive clinical experience in schools participating in a school-university partnership which meets the definition of a Professional Development School. Candidates participated in a book study about equity-based teaching and taught mathematics lessons to a small group of elementary school students. This study analyzes participants' written reflections from both experiences.

Relevant Concepts and Literature

Zone of Proximal Development

This study is grounded in sociocultural theory (Vygotsky, 1930-1934/1978) and Vygotsky's construct of the Zone of Proximal Development (Lave & Wenger, 1991). Learning is the process of developing personal knowledge and understanding through social interactions with others when the activities align to individuals' Zone of Proximal Development (Lave & Wenger, 1991; Polly et al., 2018; Vygotsky, 1930-1934/1978).

The concept of the Zone of Proximal Development holds that learning as the process of constructing knowledge between a learner and a more knowledgeable other and that learning takes place as long as the learner is engaging in activities and knowledge that are developmentally appropriate and fit within their ZPD. Specifically, ZPD in this study reflects the space in which teacher candidates are able to work with support from faculty in regards to the book study on equity, and teaching small group mathematics lessons with support from their clinical educator in an elementary school classroom.

Professional Development Schools and school-university partnerships can support teacher candidates' movement through their Zone of Proximal Development by collaborating to develop related knowledge and skills through activities in courses and clinical practice experiences (NAPDS, 2021). Further, these partnerships share the responsibility to also provide continued support and professional learning opportunities for practicing in-service teachers as well (Polly, 2017).

Equity-based Teaching Practices

In the literature, scholars have written about culturally relevant teaching, culturally responsive teaching, and equity-based teaching. In this study we are focused on equity-based teaching. Milner (2018, para 2) defines equity as the process of “developing environments and systems in ways that provide students with what they need based on careful and systematic attention to the particulars of their situation.”

Gutiérrez (2009) advanced a framework for equity-based teaching in mathematics, which has been written about in previous studies related to teacher education (Polly, 2021; Polly & Colonnese, in press). The framework includes four components which are described in Table 1. This framework was introduced to the teacher candidates in this study during their mathematics education pedagogy course taken one or two semesters before the semester in which the study took place. While candidates are introduced to all four dimensions the focus is heavily placed by faculty on Access and Power. Candidates participate in multiple experiences that allow them to analyze and modify tasks and resources to ensure that they are rigorous, current, and relevant to learners. Candidates also practice teaching tasks and activities in a way that gives elementary students power and ownership about how to start the task, show their work, and make sense of the concepts embedded in the task.

Table 1: Dimensions to Address Equity in Mathematics (from Gutiérrez, 2009)

Dimension	Description
Access	Access to rigorous and current curriculum and resources Access to high-quality mathematics teachers Access to mathematical tools (e.g., manipulatives, technology)
Achievement	Engagement in mathematics Scores on assessments Preparation for STEM-based fields
Identity	Incorporation of personal and cultural backgrounds in mathematics Opportunity for students to select and use their own strategies Opportunity for students to use their own language
Power	Able to discuss and share their thinking and strategies Ownership of their own understanding and have opportunities to make sense Use mathematics to investigate problems relevant to their community

In mathematics, equity-based practices that provide students power align with reform-based approaches that recommend that teachers begin mathematics lessons by posing a mathematical task and allowing students to explore it in various ways, such as using manipulatives, drawings, or equations to represent the task. This approach aligns to the Identity and Power aspects of the equity-based framework in Table 1 since it gives students ownership of their own understanding. This method is different from more traditional lessons where teachers directly teach and show students exactly what strategies to use to solve problems and then give them multiple opportunities to practice using those strategies.

Research studies on these approaches in mathematics shows that teachers' perceptions of their students' ability and their beliefs about how their students learn mathematics influence how teachers enact tasks and problems in their classroom (McGee et al., 2013; Stein, Remillard, & Smith, 2007). Past efforts to support teacher candidates' work in clinical practice experiences tutoring students in mathematics and teaching small groups of students has led to teacher candidates' embracing more equity-based approaches to mathematics and their enactment of equity-based practices (Polly, 2021; Polly & Colonnese, in press). Still, there is a need to further examine teacher candidates' experiences learning about equity-based practices in teacher education programs. In this case a book study of Lisa Delpit's book *Multiplication is for White People: Raising Expectations for Other People's Children* (Delpit, 2013).

This exploratory study examined the following questions:

1. What do elementary education teacher candidates' write during written reflections about a book study on equity-based practices?
2. What are elementary education teacher candidates' experiences using equity-based practices while using equity-based practices to teach small group mathematics lessons?

Methods

Context

This exploratory study involved written reflections from teacher candidates who were in their first semester of their senior year in an elementary education teacher education program located 20 miles from a large city in the southeastern United States. The teacher education program graduates approximately 120 elementary education teacher candidates each spring and 60 each fall.

During the first semester of their senior year teacher candidates complete the first half of their year-long internship. Candidates spend at least one full day in their student teaching placement. The participants in this study spent time with the same clinical educator and students that they would be working with during their full-time student teaching experience in the subsequent semester. While the minimum expectation was one full day in their school placement, many candidates spent two full days multiple weeks during the semester.

Data Sources and Data Analysis

The data in this paper comes from two primary data sources: 1) written reflections completed by elementary education teacher candidates while completing a book study on Lisa Delpit's book *Multiplication is for White People: Raising Expectations for Other People's Children* and 2) written reflections about candidates' experiences teaching small group mathematics lessons.

Written Reflection for Book Study

Candidates read and discussed *Multiplication is for White People: Raising Expectations for Other People's Children* by Lisa Delpit during the first 7 weeks of the semester. Delpit's book covers a variety of topics including but not limited to the myth of an achievement gap, high expectations for student success, developing critical thinking in students, equitable assessment practices, differentiating instruction to meet student needs and much more. Each week candidates were expected to complete a 3-2-1 protocol, which involved students paraphrasing three takeaways from the chapter, listing two text-to-classroom connections, and posing one

lingering question. At the start of the book study, candidates were put into small groups, which remained consistent throughout the semester. Discussions were held weekly for a total of 7 weeks. Each week a discussion was facilitated by one student in each small group. At the end of the small group discussions, groups were brought back together to engage in a whole-class discussion.

Small Group Mathematics Teaching Using Equity-based Practices

Candidates taught the same small group of students at least one time each week in mathematics using equity-based practices. Building on the concepts of Gutierrez' framework for equity-based teaching (2009), described earlier, candidates provided a mathematical task and allowed students to choose how to solve the task. Candidates then facilitated a discussion of the mathematical task and, if time permitted, they posed follow-up mathematical tasks. Each month during the semester (September, October, and November) candidates completed a written reflection about what they were learning about their students and what they were learning about themselves as future educators.

Data Analysis

All participants' responses were analyzed using thematic coding (Patton, 2014). Participants' reflections were coded and then the codes were organized into themes. Themes were then verified by visiting the original data. In the Findings section we describe the themes and provide excerpts from the written reflections that support the themes.

Findings

Book Study

Several themes emerged in candidates' written responses throughout the semester. The text-to-classroom connections and the questions posed by teacher candidates as part of the 3-2-1 protocol tended to be the most fruitful for data analysis as these responses went beyond summarizing the chapter to applying the information conveyed in the chapters to their own experiences in the classrooms.

Theme 1: Teacher Leadership

Many of the teacher candidates expressed concern beyond their own classroom in their written responses, illustrating their belief that the whole school must be dedicated to ensuring an equitable learning environment for all students. One candidate posed the following question in their response: *"Even if we make our classroom the most optimal environment for these children and have all the inclusions and positivity in our classroom, how can we help prevent them from walking into a classroom the next year with a teacher that is the complete opposite, and the students fall right back to believing they are worthless?"*. Another teacher candidate expressed a similar concern: *"If we are teaching older students, how do we undo the years of oppression and stereotypes of blaming poor academic performance on a "culture of poverty?"* Both candidates demonstrate an understanding that in order for sustained change to occur, their commitment to equitable teaching practices will have to extend beyond their own classroom as they advocate for change at the school or even district level.

Additionally, many teacher candidates expressed concern about how they would address the biases and deficit mindsets of their colleagues as new teachers. For example, one candidate

posed the following question: *“What is the best way for me to confront teachers that are using deficit thinking and feeding into the oppression of students rather than trying to stop it?”*. Another candidate added: *“If my coworkers are treating black students as inferiors, rather than challenging them in the classroom, what would be the right way to go about confronting them?”* These findings were common, yet not surprising as these teachers are participating in clinical experiences where they sometimes experience the tension between what they are learning in the university classroom and what they are observing in P-12 settings. Many teachers expressed concern or fear over “rocking the boat” as a new teacher, however, these same teachers knew that their decision to speak up or remain quiet would ultimately affect their students. Additionally, these patterns are interesting given the socializing nature of schools. Future studies should explore whether these same teachers remain steadfast in their commitment to equitable teaching practices or are socialized into the dominant values and beliefs of their schools.

Theme 2: Scripted Curricula

Another common theme emerging out of the 3-2-1 responses was candidates’ concern over adhering to scripted curricula. The idea of “teacher-proof[ing]” schools by way of scripted curricula was directly addressed by Lisa Delpit in chapter two, *Infinite Capacity* (Delpit, 2012, p. 34); however, candidates’ concern over scripted curriculum was commonly voiced even in discussions beyond this chapter. One teacher candidate voiced their concern in the following statement: *“The worry of being forced to do scripted lessons that aren’t thought-provoking or engaging is something that I worry about. I personally value the chane [sic] for teachers to create interactive lessons that push students to higher level thinking.”* Not only was scripted curriculum noted as a barrier to planning activities that demand higher order thinking, but it was also seen as a barrier to culturally responsive teaching practices. One candidate stated that they *“noticed while observing classrooms how many teachers have lost a bit of their autonomy in their classroom”* and went on to state: *“I believe that this is due to the stresses of meeting various requirements and it becomes a script of how to teach, when to teach, and what to teach instead of allowing for student and teacher relationships to drive the curriculum.”* Perhaps, Delpit’s discussion of scripted curriculum really hit home for many teacher candidates who were required to attend to the personal, cultural, and community assets of their students during the planning of their learning segment for edTPA, yet were limited in regard to the texts or even examples they could provide during a lesson because of strict adherence to a particular curriculum. The following question posed by a student teacher illustrates what may be one teacher’s first encounter with what is commonly referred to as “the swinging pendulum” of educational policy and best-practice: *“So many teachers have so many different ideas and ways of doing certain things so who’s idea of it being “appropriate instruction” is the accurate one?”* From a teacher educator’s perspective, this question implores the need for more opportunities for teacher candidates to engage in their own research so that they can take their own critical stance on the programs and practices that are being handed down to them.

Theme 3: Planning Instruction Based on Students Assets

A common theme within Delpit’s work, and also a common point of discussion in candidate’s text-to-classroom connections, was the idea of using students’ backgrounds in order to build effective instruction. Many candidates demonstrated the belief that their students’ backgrounds, interests, and cultures were an important resource for planning. In fact, in

explaining the connection she had to Delpit's text one teacher candidate stated: *"The first connection I had was with using kids' natural instincts as assets not issues."* This statement reflects the candidate's understanding that students' backgrounds, interests, and cultures can serve as building blocks upon which they can increase student understanding and engagement with the content, a central tenet of culturally responsive teaching. Another teacher candidate mentioned how she intends on switching up the examples she provides during instruction so that all students have examples that are relevant to their lives. This sentiment is reflected in the following statement provided in her 3-2-1 response: *"Each child comes from a different type of home, family, culture, etc., and I want to make sure that I am incorporating all of my students' different backgrounds into my lessons. I never want anyone to feel as if they cannot relate to what I am saying or they are lost at my examples simply due to where they come from or what they have access to."* Other teachers went as far as listing tangible practices that they hope to employ in their classrooms: *"Another connection in this same realm is the option of choice. I believe playlists/menus that allow for creativity and choice while still aligning to the curriculum is key. You allow students who prefer to write to write, prefer to draw/be creative they can be. It is all about recognizing their needs and running with it. You have to be flexible as a teacher and adapt each year. No group of kids will ever be alike and they will need different things each year."* Based on these responses from teacher candidates throughout the book study, the researchers intended to determine whether these same practices carried over into small group math instruction.

Small Group Math Teaching

Theme 4: Students are Able to Solve Challenging Tasks and Explain their Processes

During the semester many candidates reported that they noticed that their students' were improving in their ability to approach and successfully solve challenging tasks and explain how they solved the tasks. Many candidates reported that they were in classrooms where students did not have a lot of prior experience where they were given the freedom to explore and solve mathematical tasks, and even if they were the focus was on the answer instead of students' explanation about how they found the answer. The idea of students who sometimes are labeled as performing below grade level expectations provided evidence to teacher candidates that in the appropriate setting, they could persevere instead of immediately give up when faced with challenging tasks.

One teacher candidate wrote, *"I have seen my students grow in their ability to use strategies to figure out the math problems they are struggling with. A couple of my students used to just give up right away and ask for help on addition problems that they have been working on for a couple weeks."*

Another part of this theme in candidates' written reflections focused on students' increased confidence in their problem solving and mathematics skills. One candidate commented, *"I have definitely noticed my students becoming more confident in their math skills and the responses they are giving. Instead of just giving the answer, they are giving the answer and explaining how they got to that answer. They are also doing really well when it comes to working through problems on their own."*

Candidates' reports provide evidence that they were beginning to apply what they had learned from the book study in terms of challenging students by being a warm demander as well as apply the Identify and Power aspects of the equity-based practices framework,

One candidate was placed with a small group of students who, despite experiencing poverty, had met grade level expectations. The candidate shared that the students have grown in their ability to communicate and explain their thinking. She reported:

"I have seen my students grow in being able to explain mathematics concepts rather than just solving the problems...I have challenged them by asking "Why is that? How did you get to your answer?" to get them to think deeply about the concepts rather than just develop fluency in solving."

Theme 5: Candidates' Use of Equity-based Practices

Candidates' reflections of their small group mathematics teaching experience included multiple comments about their strengths. A few commented on the concept of a "warm demander" from the book study. *"I feel very confident in the classroom and my heart feels so full when I see my students growing either academically or socially. My students know that I can be very strict with them, but it's because I care about them and their success (warm demander)."*

Candidates' reflections also included information about their strengths supporting students during the exploration of mathematical tasks.

Multiple reflections included responses about candidates' interaction with students and how well their students worked in small group settings.

One candidate wrote, *"I always underestimate myself and think that I won't be good or successful in this career, but then I work with my students and it's very reassuring. The students respond really well to me and we always have a lot of fun together during the lesson. I am able to have a good bond with all of them while also keeping that student/teacher separation."*

Another subtheme in candidates' reflections focused on their preference to have students engaged in activities and projects rather than just worksheets. Candidates were provided with autonomy to work with their clinical educator to design or co-design tasks and activities to do in the small group mathematics lessons. One candidate wrote, *"I am learning that I prefer students doing activities and projects related to content much more than worksheets or simple assignments. The activities that I have been able to do are fun for me as a teacher and I really enjoy watching the students have fun with them too!"*

Another candidate wrote about creating relevant activities. These responses focused on the benefit of knowing about their students' interests and using that knowledge to help plan lessons. One candidate wrote, *"I have learned that many students come from a diverse background. All students love hands-on learning activities and to sing songs and dance. This music method of learning really helps them remember the content because they consistently refer back to the song."*

Another candidate noted that her lessons improved once she determined her students' personal interests. *"I am learning that I really like to make my problems creative. I want the problem to be relevant and engaging for my students, and that helps them be more interested in math."*

Theme 6: Equity-based Teaching is a Journey

Candidates took the opportunity in their reflections to discuss areas that they are learning about themselves that they would like to further develop in the future. These focused specifically on managing the learning environment and routines related to teaching children.

One candidate wrote about her need to focus more on clarity when giving directions. *“I am learning that when I teach, I am not always so clear when I am giving directions. Some students ask for clarification often which tells me that what I said to them wasn’t clear and I need to be more mindful of how it comes out to the students.”*

Another set of responses focused on managing the learning environment and the boundary of teacher and friend. A candidate wrote:

“I need to work on my classroom management skills because I feel like when I teach I just want to be the students friend and when they call out to make a comment during my lesson I will stop to listen to them so they don’t feel neglected but that also isn’t good because it distracts other students from learning and we can get off task easily.”

Discussion

The findings above provide a foundation for discussion related to the impact of this study on the field as well as implications for future work. We detail these in this section.

Factors Influencing Equity-Based Teaching

As indicated in the themes above, the findings in the study impact the field by providing evidence that a book study, when coupled with an intentionally-designed clinical practice experience that involves teaching, can help develop teacher candidates’ knowledge and skills related to using equity-based practices. The themes provide evidence that candidates felt that while they value equity-based practices and can do the work to determine their students’ assets (Theme 3), the culture of the school (Theme 1 and Theme 2) and the school district (Theme 2) also greatly influence teachers’ ability to use these practices in their classrooms.

Candidates’ responses on Theme 1 and Theme 2 bring to light the importance of school leaders’ and district leaders’ continued learning, advocacy for, and decision-making authority as it relates to promoting equity-based practices. While scholars have discussed this before (Milner et al., 2015), there is a dire need for professional learning programs as well as programs that prepare school leaders to take on this responsibility.

From a Professional Development School and school-university partnership perspective there is a need for further examination of how universities and schools can collaborate to support the advancement of equity-based practices in their schools and teacher education programs. While simultaneous professional learning opportunities that involve individuals primarily located in P-12 schools or teacher education programs may have some benefit (NAPDS, 2021), there is a need for scholars and leaders to examine innovative ways to accomplish this goal.

Leveraging a Book Study as an Opportunity for Growth

Candidates invested a lot of time, energy, and emotion into reading the book *Multiplication is for White People: Raising Expectations for Other People’s Children* (Delpit, 2013), writing weekly reflections, and participating in the book study. In the text, the concept of a “warm demander” has been one of candidates’ most remembered concepts in the past few years, and also in the data analyzed in the study. The concept of “warm demander” was discussed and revisited multiple times during the semester, including discussions of their clinical experiences, examples where their clinical educator or they themselves demonstrated characteristics of the concept. As instructors we learned about the importance of focusing the

book study on a few key, impactful concepts, that could be integrated into multiple parts of the course.

Another take away from our book study focused on the importance of coupling academic learning, reflections on how that learning can be applied, and opportunities to apply the learning in relevant and meaningful ways. Teacher education programs must ensure that the clinical practice experiences are intentionally designed in partnership with P-12 school partners to advance and not contradict the content and big ideas emphasized in education courses. Had our school partners not allowed candidates to teach the mathematics small groups in specific ways that aligned to equity-based practices there would have been a cognitive disconnect between what candidates were learning about during the book study and what they were seeing and allowed to do during their clinicals.

Researching the Impact of Equity-based Practices

We find irony in the notion that the book studied in the course reported that many schools in the United States have gone to mandated scripted curriculum in order to improve teaching and learning, yet our teacher candidates reported when they were given autonomy and support to teach mathematics using aspects of equity-based teaching and in ways that were relevant to their students their elementary school students learned mathematics and increased in their confidence. For this we are excited about the potential future use and scale-up of the project that coupled a book study with an intentionally-designed clinical experience. Nevertheless, we must address the need for further research studies that focus more on P-12 student learning.

While this study provides evidence about candidates' perceptions, we acknowledge, as many others have in education (e.g., Borko, 2004; Cochran-Smith et al., 2017), there is a need for further studies that examine teacher candidates' use of equity-based teaching practices and its impact on student achievement in ways that meet the stringent requirements of quantitative research studies. Whether these studies examine curriculum-based assessments or large-scale statewide assessments or other measures of student learning, the field of education and the niche of school-university partnerships requires more "hard" and scientifically-like research about how specific instructional practices impact teaching and learning.

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