



## **Creating Coherence in Teacher Preparation**

### **Examining Teacher Candidates' Conceptualizations and Practices for Equity**

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#### **Abstract**

This study aims to examine coherence in a teacher preparation program relative to equity. Using performance assessments and artifacts from coursework, we explore how candidates define equity, what equitable practices they enact in their field placements, and whether a relationship exists between their conceptualizations and their practice. We found that candidates' conceptualizations of equity were characterized by five categories; however, their conceptualizations were varied and wide ranging. Findings also show that candidates emphasized attention to student thinking in their teaching, a practice often described in frameworks for ambitious mathematics teaching. Lastly, we found little evidence of consistency between candidates' conceptualizations and their instructional practices. The

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findings suggest a need to examine the coherence among various features of the teacher education program design and the experiences offered to candidates in these programs.

## **Introduction**

Creating coherence is a persistent problem for teacher preparation programs (Darling-Hammond, 2006a; Zeichner, 2010). Preparation programs are challenged to align components of their programs—courses and field placements—to prepare beginning teachers for the profession. Many scholars have generated a range of principles for structuring teacher preparation programs to address coherence problems, such as articulating a common vision of teaching (e.g., Kennedy, 2006), placing a stronger emphasis on connecting theory and practice (e.g., Feiman-Nemser, 2001; Grossman, Hammerness, & McDonald, 2009), and centering teacher candidates' development of core practices (e.g., Forzani, 2014). Additionally, many teacher education scholars have generated a range of outcomes to which teacher preparation programs should hold themselves accountable, such as developing teacher candidates' knowledge of learners, content, and teaching (Darling-Hammond & Bransford, 2005; Feiman-Nemser, 2001); making visible the major challenges teachers face throughout their careers (Kennedy, 2016); and developing commitments to equity and social justice (e.g., Darling-Hammond, 2006b). There is no shortage of outcomes to which the field should aspire. What is needed is a connection between teacher preparation outcomes and understanding programmatic coherence relative to these outcomes.

In this article, we examine issues of coherence in teacher preparation by focusing on one of these outcomes: equity. We focus on this particular outcome because of the role teacher preparation programs can play in developing future teachers' advocacy and instructional practice for promoting equity (Hollins, 2015; Nieto, 2000). We also focus on equity because of the variation in perspectives on equity in the field of teaching and learning, including critical perspectives that focus on racial, gender, and sexual identities; center broadening participation in classrooms; and focus on the experiences of marginalized learners, such as multilingual and exceptional learners (Esmonde & Booker, 2016). Moreover, many of the studies focused on candidates' conceptualizations and practices for equity are situated within a particular course over a single semester using one source of data (Mills & Ballantyne, 2016). Though insightful into understanding particular goals for promoting candidates' commitments to equity, these studies often fail to take a systemic view of teacher preparation and situate candidates' learning and development within the larger program (Cochran-Smith & Villegas, 2015; Cochran-Smith et al., 2015).

To date, teacher preparation scholarship has not focused on examining programs systematically to interrogate the extent to which they are coherent to advance particular aims. To systematically examine coherence, this study uses data collected

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at two different time points that provide insight into how candidates conceptualize equity and the practices they enact to promote equity. The design of this study is guided by a broad, underlying conjecture about program coherence: If a program were coherent in its approach to addressing any particular outcome, then there would be evidence of alignment between candidates' conceptualizations and practices. Thus we organize the study around three questions:

What are candidates' conceptualizations of equity?

What equitable teaching practices do candidates enact, if any?

What evidence of coherence exists when examining the relationship between candidates' conceptualizations of equity and their practice?

Together, these questions serve to provide insight into the alignment between how candidates come to conceptualize a core commitment of teacher preparation—equity—and then, later, whether and how those conceptualizations of equity are aligned with the ways in which they seek to enact equitable practices.

In this article, we narrow our inquiry to elementary teacher candidates' conceptualizations of equity as it relates to their mathematics teaching. Persistent inequities in student achievement and access are well documented in mathematics education (Gutiérrez, 2009; Martin, 2009). Recent research has argued that elementary teachers continue to be underprepared to support underrepresented communities in mathematics (Aguirre et al., 2012; Bartell et al., 2017). We seek to investigate the nature of candidates' understanding of broader concepts related to equity as they arise in the context of content-specific instruction, providing insight into the coherence between program commitments, designs for learning, and candidates' beginning teaching.

### **Understanding Coherence in Teacher Preparation**

Nearly a decade ago, Darling-Hammond (2006a) proposed a model of teacher preparation that challenged the field to examine how programs are organized for promoting teacher candidates' learning. This model argues for a number of aims that teacher preparation programs should strive to achieve, primarily around developing commitments to, dispositions toward, and knowledge of diverse learners, curriculum and subject matter, and teaching. Others have identified aims that are aligned with and expand on those articulated by Darling-Hammond, most notably providing candidates with opportunities to develop a beginning repertoire of practice (Feiman-Nemser, 2001; Grossman, Hammerness, & McDonald, 2009), develop skills and dispositions to learn from practice (Darling-Hammond, 2006b; Feiman-Nemser, 2001; Santagata & Yeh, 2014; Sun & van Es, 2015), promote equity (Hollins, 2015; Nieto, 2000), and develop an understanding of and practice troubleshooting the challenges of teaching (Kennedy, 2016). These components

make up a vision for teacher preparation that is consistent with those set forth by state and national reform and policy documents (California Commission on Teacher Credentialing, 2016).

Darling-Hammond's model also challenges teacher preparation programs to examine *how* programs are organized and, in doing so, illuminates issues of *coherence*, referring to the disconnects among courses and between university coursework and fieldwork. Grossman et al. (2009) located this issue, in part, in the separation of methods courses from courses aimed at providing candidates with conceptual or theoretical tools. They, and others (e.g., Cochran-Smith et al., 2014; Zeichner, 2010), also articulate that the separation of coursework and fieldwork emerges from viewing student teaching placements as a space for candidates to enact or use theoretical principles or conceptual tools, as opposed to attending to the interplay between coursework and fieldwork. These studies highlighted the myriad ways in which (in)coherence may emerge in teacher preparation, motivating the need to study program coherence.

To date, however, the predominant forms of research in teacher preparation have not been conducive to examining program coherence. Research in teacher preparation typically does not examine questions across time points, often relying on data collected from single sources of data (Cochran-Smith et al., 2015). Additionally, teacher preparation research has not had a focus on examining the outcomes of teacher preparation, including the ways in which candidates think about and enact practice (Cochran-Smith et al., 2015; Diez, 2010; Grossman & McDonald, 2008). However, some bodies of work have examined coherence in different ways. Some scholars examine the perceptions candidates hold and develop in relation to the aims of teacher preparation (e.g., Heggen & Terum, 2013; Smeby & Heggen, 2014). Others have studied coherence by examining the pedagogies of teacher preparation relative to programs' stated goals and commitments (Rojas & Chandía, 2015). And still others have examined the relationship between the pedagogies of program graduates and program outcomes and curriculum (Hammerness, 2006). These studies of coherence, however, do not focus on specific teacher preparation outcomes and do not draw connections between candidates' conceptualizations and their instructional practice.

Our study builds on Hammerness's (2006) use of instructional practice for examining program coherence by centering *candidates'* instructional practice in the program, as opposed to graduates, as it relates to conceptualizations they develop in their coursework. We draw on the work of van Es and Sherin (2008) to motivate the need to attend to the consistency between conceptualizations and practice, specifically drawing on their use of *specificity* in the context of teachers' noticing. In their study, van Es and Sherin used as an analytic framework the ways in which teachers talk about specific events and the ways those events serve as "cases of" more general principles. We position this work as making visible alignment between candidates' conceptualizations, as general principles without the particularities of

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the event, and the ways in which candidates enact and talk about and make general specific events in their instructional practice.

In the case of examining candidates' conceptualizations and practices for studying coherence, van Es and Sherin's (2008) framework suggested attending to both general principles of teaching and learning that guide candidates' thinking and the ways that they talk about these principles of practice specifically. We conjecture that programs that are more coherent would result in greater alignment between candidates' conceptualizations of general equity principles and the ways in which they identify and articulate these equity principles in specific interactions in practice. We now turn to frame equity for this study to examine how candidates conceptualize and attempt to enact equitable instructional practices in their classrooms.

### **Framing Equity in Teacher Preparation**

We draw on research that has conceptualized equity in the context of teaching, teacher education, and teacher preparation. This literature points to two broad dimensions of equity in teaching and teacher preparation. The first focuses on developing candidates' and teachers' awareness of and attention to the broader sociopolitical context of schooling. The second focuses on the kinds of practices candidates must begin to develop to advance equity in their practice. For the second dimension, we draw on mathematics education researchers because (a) mathematics education scholars have produced a wealth of knowledge about equity in mathematics and (b) candidates' practices are embedded in mathematics lessons, as captured for a program-wide performance assessment (Stanford Center for Assessment, Learning, and Equity, 2015).

#### ***The Development of Sociopolitical Awareness and Dispositions***

Teacher preparation scholars have identified the development of candidates' awareness of and attention to the sociopolitically situated nature of classrooms as a key aim in the work of teacher preparation (Hollins, 2015; Nieto, 2000), informed by research that documents that new teachers blame students, their families, or their communities for students' low achievement (Sleeter, 2017). We frame equity in teacher preparation as an attention to and awareness of the sociopolitical context of schools and the implications for learning environments (Willey & Drake, 2013). We draw on the work of Bartolome (1994, 2007) in conceptualizing *political clarity*, or the process by which individuals become increasingly aware of the consequences that the political and economic context has on day-to-day conditions in classrooms and on students. For Bartolome, this entails candidates recognizing that students and classrooms are situated within politicized social, cultural, and historical environments that play out in moment-to-moment classroom interactions. Collectively, these interactions have consequences for students' access, achieve-

ment, and forms of participation (Gutiérrez, 2009) and, Bartolome argues, require that teachers critically interrogate school and community policies that subordinate historically marginalized students.

This issue is particularly acute in mathematics education research, which has explicated the ways in which politicized social, cultural, and historical environments impact whether and how students are provided with opportunities to learn in math classrooms (Martin, 2009). For instance, Battey and Leyva (2016) offered a framework for understanding how Whiteness operates upon students of color in mathematics classrooms through the inequitable distribution of cognitive, emotional, and behavioral labor among learners. Martin (2007, 2009) also revealed the ways White teachers can damage Black students' mathematical identities by restricting their access to advanced mathematical learning environments. He noted that many reform efforts in mathematics education motivate a color-blind and assimilationist orientation in their approach by deemphasizing and avoiding issues of race in mathematics, through the narrow focus on increasing participation in mathematics. Because these reform initiatives largely shape the curriculum experience in mathematics, the classroom learning environments come to reflect the politicized environments in which they are situated.

### ***Enacting Practices for Promoting Equity in Mathematics***

Research has documented efforts to disrupt the deeply entrenched institutional framings of mathematics instruction that arise in classroom practice by offering a range of constructs to understand teacher candidates' practice in relation to equity (e.g., Bartell et al., 2017; Gutiérrez, 2009; Nasir et al., 2014). Using Hand's (2012) model on equitable mathematics instruction, we focus on a set of key features to help organize the range of practices found in the literature on equitable teaching. This model centers the notion of positioning (see Davies & Harré, 1990) and providing opportunities for learners to take up space in classrooms, connecting and integrating mathematical and cultural activity, and making explicit to learners the existence of hierarchies and inequitable systems (Hand, 2012). Research on equitable instruction has highlighted the importance of eliciting and attending to student ideas and making in-the-moment instructional decisions that are responsive to students' thinking. By focusing on and responding to student thinking, students can become positioned as capable of offering valuable insight that can shape classroom interactions (Aguirre et al., 2012; Cochran-Smith, 2004).

Typically, engaging students in collaborative group work around rich mathematical tasks has been viewed as an important way to make student thinking visible while also creating opportunities for students to take up space in mathematics (e.g., Boaler & Staples, 2008; Esmonde, 2009; Nasir et al., 2014). In Hand's (2012) model, for example, engaging students in group work around rich tasks also offers opportunities for students' behavior to become (re)positioned. That is, what might

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be viewed traditionally as off-task or disruptive behavior offers an opportunity for teachers to engage in dialogue with students to reposition their actions as mathematically productive. This model also seeks to reposition students' behavior as mathematically productive by blurring the line between mathematical and cultural activity to broaden what it means to do mathematics.

Literature has also pointed to the importance of teachers making explicit inequitable systems to develop learners' orientations to social justice and disrupting inequities. For Hand (2012), teachers ought to make visible aspects of mathematics education that are produced by the broader sociopolitical environment to help learners reframe their participation in mathematics. Others have argued that promoting the development of a social justice orientation helps learners reframe their participation in school (Freire, 1972; Gutstein, 2003; Ladson-Billings, 1997). Thus making systems visible and providing opportunities for learners to critically examine existing hierarchies and power structures affords learners the ability to view mathematics as a way to redress inequities and injustices.

Having framed equity, the purpose of this article is to understand the extent to which a teacher preparation program is coherent for advancing equity in its preparation of teacher candidates by focusing on key teacher education outcomes on equity: conceptualizations of equity and practices for equity. Thus we frame equity in these two ways—the development of sociopolitical awareness and the enactment of practices for promoting equity in mathematics—to inform the ways in which we analyze data on candidates' conceptualizations and practices for equity separately. We then examine the alignment between conceptualizations and practice for understanding the extent to which the program was coherent for advancing equity. Specifically, we used two sets of data—a culminating written assignment from a course focused on culture, equity, and diversity and selected segments from the edTPA portfolio assessment of teaching (Stanford Center for Assessment, Learning, and Equity, 2015)—to examine how candidates understood issues of equity as they pertain to the work of teaching and how these understandings were taken up in teaching. Our aim is to understand coherence in a teacher preparation program by studying the nuanced ways teacher candidates conceptualized the construct of equity and whether and how their conceptualizations arose in their instructional practice and reflections on teaching.

## **Method**

### ***Setting and Data Sources***

This exploratory study took place in the context of an elementary education teacher preparation program at a large research-intensive university in the West. The program is 14 months long, including coursework and field experiences in the summer, three quarters during the academic year with students placed in school sites,



and a final summer quarter with coursework. The program is organized around five core commitments: promoting equity, knowledge of learning and learners, practices for teaching and learning in content areas, learning from teaching, and preparing candidates to become instructional leaders (see the appendix). Data for this study come from candidates ( $n = 53$ ) seeking their multiple-subject teaching credential, in the first year of the enactment of the redesigned program. The candidates came from diverse ethnic groups, Chicana/Latina ( $n = 17$ ), White ( $n = 12$ ), and Asian/Pacific Islander ( $n = 15$ ) making up the majority of the candidates.

We use data generated by candidates' engagement in the program on their conceptualizations and practice to gain insight into program coherence. To that end, we position these data as outcome data. Two sources of data compose the data set for this study, one of which offers insight into candidates' conceptualizations and the other serving as a window into candidates' practice. The first, which served as our window into candidates' conceptualizations, was a final assignment in the form of a written essay for a required course on diversity and equity that took place in the fall quarter of the program, when candidates began their first field placements. The second data source, which served as our insight into candidates' practice, was a subset ( $n = 9$ ) of the portfolio assessments that all teacher candidates complete as part of the credentialing requirement and that included video clips of instruction and written reflection. We describe each in detail.

The first source of data consisted of candidates' final assignment for a course entitled Cultural Diversity and Equity. This course occurred in the fall quarter of the 2016–2017 academic year and coincided with students' initial school-based field placements, where students were primarily observers of their mentor teachers' classrooms. The course was designed to engage candidates in conversations around issues of diversity and equity and to develop candidates' conceptualizations of equity. All multiple-subject candidates ( $n = 53$ ) in the program were enrolled in one of two separate, but concurrent, sections of the course. The assignments took the form of written responses to questions about equity, and all multiple-subject candidates were required to complete the assignment, which became the focal artifact for analysis.

We used the final assignment because we wanted to understand how the conceptualizations candidates developed or held at the conclusion of the course were related to their subsequent teaching. The assignment required that teacher candidates write a two- to three-page essay answering three prompts: (a) What is your definition of equity? (b) What readings or other content from the course, such as discussions, video, and presentations, did you draw upon to come to your definition of equity? and (c) Did your conception of equity change since the beginning of the course? Candidates were encouraged to write about multiple facets of equity for each of the questions. The unit of analysis for teacher candidates' conceptualizations included statements about how they defined equity and what equity meant to them. We did not take into account their responses to the third question because we were more



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interested in their understanding of equity and less in their perceived change in their understandings over time.

The second source of data consisted of summative performance assessment portfolios that candidates were required to complete for certification in California, the edTPA, or Teacher Performance Assessment (Stanford Center for Assessment, Learning, and Equity, 2015). Candidates submitted the portfolios in March, at the end of the second quarter, the quarter following the course on equity. The program administered the edTPA, which assessed candidates on three tasks: planning for and enacting a lesson and assessing student learning. The planning task required candidates to plan a series of lessons around specific learning goals, justify decisions, and reflect on how they plan for particular students or circumstances. The instruction task prompted candidates to submit short (15 minutes or less) video clips of instruction and reflect on the video they submitted. The assessment task prompted candidates to reflect on how they knew whether students met the specified learning goal.

All 53 elementary candidates in the program were required to submit a mathematics lesson for their edTPA portfolios. After Phase 1 of analysis (described later), we selected a subset of candidate responses ( $n = 9$ ) to the edTPA portfolios for further analysis using three criteria: (a) All categories of equity conceptualizations generated from the first phase of analysis were represented; (b) the candidate gave permission to the program to access their portfolios for research; and (c) candidates were placed in schools with the highest proportion of students eligible for the free/reduced-price lunch program because they afforded opportunities for equity-oriented practices and reflection to emerge. We selected specific questions from Tasks 1 and 2 of the edTPA because they prompted candidates to consider the “variety of learners” in the class that may have required additional or differentiated supports, such as English learners and underperforming students. These included questions that asked candidates to describe what they knew about their students relative to their everyday language, cultural background and practices, and interests; how their instructional strategies were appropriate for the diversity of learners in their classes; and the changes they would make to better support individual learners. Because these questions most directly asked candidates about their planning and teaching for equity, they would likely elicit responses that articulated a rationale grounded in equity theories for informed instructional decisions. All candidates submitted lesson materials for a sequence of lessons; one to two short video clips from a lesson or multiple lessons, totaling no more than 15 minutes; and written commentary responding to prompts asking candidates to reflect on their planning and teaching. The unit of analysis for practice, then, comprised both candidates’ submitted video clips and their responses to a set of questions about their planning and instruction.

### **Data Analysis**

Three phases comprised the analysis for this study. The first phase of analysis focused on uncovering the range of candidates' conceptualizations of equity, using the responses to the equity prompts from the *Culture, Diversity, & Equity* class (n = 53). The second phase centered on surfacing candidates' equitable instructional practices using the candidates' portfolio assessments, primarily focusing on the use of group work (Boaler & Staples, 2008); incorporating students' funds of knowledge (Moll et al., 1992; Turner et al., 2012); attending to students' thinking (Cochran-Smith, 2004); and developing students' orientations to social justice (Freire, 1972; Gutstein, 2006). The final phase focused on finding connections between candidates' conceptualizations and practice through analysis of both sets of data, and served as the primary phase of analysis for surfacing evidence of programmatic coherence. For the first phase of analysis, we drew on a definition of equity centered on an awareness and understanding of the broader sociopolitical context and their impact on schools and classrooms (Bartolome, 1994, 2007; Martin, 2007, 2009). Analysis centered on candidates' definitions and explanations of equity, examining the content, depth, and specificity with which candidates elaborated on these definitions. Informed by the literature, the first author inductively coded a subset of candidates' equity definitions and explanations and generated codes and descriptions from the data (Glaser, Strauss, & Strutzel, 1967). The first author wrote an analytic memo describing what each candidate emphasized, and these memos were also coded.

The first author then reviewed the codes and engaged in constant comparative analysis (Glaser et al., 1967) to generate a coding framework, reaching a point of saturation after coding 25 responses and associated memos, consisting of six revised categories and accompanying codes. This coding framework was then applied to the remaining 28 responses. Using this coding framework on the remaining responses, the first author then wrote brief memos characterizing the specific ways in which candidates conceptualized equity relative to the six categories in the coding framework. These brief memos were then clustered into like categories (Saldaña, 2013), resulting in five conceptualizations of equity. In a small number of cases, the category under which candidates fell was not clear. In these cases, we relied on the specificity and detail of candidates' essays, as well as analytic memos and initial codes, to make decisions about the category to which they belonged.

The second phase of analysis focused on the second research question: What equitable practices do candidates enact? We first sampled nine candidates across each of the equity conceptualization categories generated from the first phase of analysis by selecting the candidates placed in the schools with the highest proportion of students who receive free/reduced-price lunch. The first author analyzed their edTPA portfolios, including both the written reflections and the video clips. The analysis was informed by research on equitable instructional practice organized around the use of group work (Boaler & Staples, 2008), incorporating students'

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funds of knowledge (Moll et al., 1992; Turner et al., 2012), attending to students' thinking (Cochran-Smith, 2004), and developing students' orientations to social justice (Freire, 1972; Gutstein, 2006). While this framework helped develop theoretical sensitivity (Glaser et al., 1967), we generated themes from the data. For each candidate, the first author open-coded, line-by-line, the selected reflections pertaining to candidates' lesson planning, wrote an analytic memo, and then coded their classroom video in 2-minute time segments (Borko et al., 2008; Sun & van Es, 2015; van Es & Sherin, 2008). Analytic memos were created for each video and instructional commentary response. Finally, analytic memos were also developed that focused on the candidates' practice for equity across all documents and video clips. The analytic memos focused on the range of equity practices enacted and the particular practices that were most salient for each candidate.

The final phase of analysis centered on the relationship between the nine candidates' practice and their conceptualization of equity and relied primarily on analytic memos generated from the first two phases of analysis. After examining analytic memos across the equity papers, the nine video clips, and reflections, we then wrote analytic memos for each candidate on the relationship between their conceptualizations and their practice. The memos centered on the extent to which aspects of candidates' conceptualizations in their equity papers emerged in their practice, and vice versa. Analytic memos, then, focused on the similarities and differences between each candidate's practice and conceptualizations of equity and whether their conceptualizations influenced their practice.

## **Findings**

Our analysis revealed limited programmatic coherence, evidenced by the lack of alignment between candidates' conceptualizations of equity and the ways in which candidates attempted to enact equity in their instructional practice. To highlight the alignment and misalignment that we observed, we first briefly describe (a) the range of candidates' equity conceptualizations that surfaced in their essays and (b) the ways candidates attempted to enact equity in their instructional practice three months later. We then examine candidates' conceptualizations in conjunction with their practice to understand the extent to which conceptualizations and practice are aligned, offering us insight into program coherence.

### ***Candidates' Conceptualizations of Equity***

Our analysis revealed five categories of candidates' equity conceptualizations (Table 1).

The first category centered on leveraging students' experiences and cultures in the classrooms, where candidates defined equity as needing to understand students' cultural backgrounds to leverage students' cultural assets during instruction. The

**Table 1**  
**Teacher Candidates' Equity Conceptualizations**

<i>Conceptualization</i>	<i>Example</i>	<i>No. of candidates</i>
Leveraging students' experiences and cultures in the classroom	Using different cultural backgrounds as assets to shape instruction is essential to learning. . . . Students bring so much knowledge into classrooms that get ignored and brushed away because it may seem unconventional to do things differently.	18
Understanding the broader sociopolitical context on classrooms	Members of the LGBTQ community are often victims of hate crimes. Inside the classroom, a student who has been singled out as a member of this community is often also the victim of bullying. . . . Equity inside the classroom means recognizing, acknowledging and acting upon the larger cultural contexts which perpetuate systems of bias and inequality and having ways for teachers and students to meet those systems.	8
Understanding the importance of creating classroom environments that promote broad participation	Another important aspect of equity is providing multiple opportunities for students to learn and show their learning. . . . An example of having multiple opportunities is presenting material visually, providing opportunities for hands on learning, and also presenting material via auditory processing.	11
Having an awareness of the biases teachers have toward students	Many teachers will go into the classroom already assuming that certain students are not capable. . . . This already creates an unlevel playing field from day one when the teacher does not believe in the student before they even have a chance to prove themselves.	8
Identifying and examining specific supports students need to participate and succeed in classrooms	Special education students are falling farther behind because they keep getting pulled out during important lessons. What the RSP and the teacher can do to prevent this gap is to collaborate with each other. . . . [RSP teachers] can also involve the special education students to do more collaborative work with the other students.	8

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second category focused on understanding how the broader social and political context and power structures impact and shape the classroom environment. In these conceptualizations, candidates looked to make connections between inequities that existed in the world broadly and how they manifested in schools and classrooms. The third conceptualization revolved around the importance of creating classroom environments that promote students' participation and engagement, with particular attention to broadening participation so students have access to conversations about the subject matter. The fourth conceptualization concerned being aware of teachers' biases about students and the role these biases play in how teachers interact with and position particular students as capable or incapable. Finally, the fifth conceptualization foregrounded a need to identify and examine specific supports and resources students need to participate and succeed in the classroom. Candidates who emphasized this in their conceptualization of equity discussed the need to navigate additional resources for students with disabilities or students who are learning English. Consistent with prior research (Mills & Ballantyne, 2016), teacher candidates vary in their conceptions of equity.

As we consider these conceptualizations in light of research on equity as framed by a sociopolitical perspective, along with an instructional lens that features tasks and student positioning, we see that the candidates varied in their uptake of these constructs. While they all drew broadly on theories across these constructs, they varied in privileging a focus on the analysis of the sociopolitical environment and how that shapes classroom life, while others drew more attention to practices for enacting equity in practice, by, for example, attending to the ways that students' cultural knowledge and resources can be brought to bear on their learning. In terms of examining program coherence, what is of particular interest to us is whether and how candidates enacted these conceptualizations in practice. We now turn to examining the nine candidates' practices to investigate this question.

#### ***Candidates' Practices for Equity***

Our analysis of candidates' equitable practices surfaced three themes: attending to and eliciting student thinking, viewing students' assets as coming primarily from the school and classroom, and using multiple representations. We summarize these themes and offer examples in Table 2.

The most salient theme we observed was candidates' emphasis on attending to and eliciting student thinking. All nine of the candidates asked students to share their thinking, either in whole-group discussions or using visual representations on whiteboards. When candidates were prompted to identify students' personal experiences and cultural and community assets, eight of the nine candidates described students' experiences in school (e.g., creating tasks that leverage students' experiences using the school's currency), while one candidate described how her students reference *telenovelas* that they watch at home, which she then used as the

**Table 2**  
**Candidates' Enactment of Equity in Their Instructional Practice**

<i>Theme</i>	<i>Example</i>
Viewing students' assets as coming from the school and classroom	<p><i>A candidate's commentary on one of the video clips she submitted.</i></p> <p>Most of my students have attended this school since its opening in 2014. Thus, many of my students are familiar with one another and the school climate. The school emphasizes an environment that allows opportunities for students to take risks, persevere in their learning, and collaborate as students face challenges in both their learning and everyday lives. Similarly, our classroom culture is based on growth mindset and allowing students to show their thinking (through various means) as they take ownership of their own learning.</p>
Attention to student thinking	<p><i>Classroom interaction in one of the candidate's submitted video clips.</i></p> <p>CANDIDATE: Okay, John see. What do you think our rule is? JOHN: I think about the three, about the four vertices. CANDIDATE: [gasps to show she is impressed] Can you say that nice and loud in your big kindergarten voice. JOHN: I think it is the four vertices. CANDIDATE: It's the rule? Ah. That was the rule! So he . . . JOSE: For me it wasn't. CANDIDATE: What was, what rule did you think it was? JOSE: The sides . . . they're all equal sides. CANDIDATE: Ah, but, John can you tell why you thought the rule was vertices and not sides?</p>
Using multiple representations	<p><i>A candidate's commentary on one of the video clips she submitted.</i></p> <p>I [provided] multiple means of representation by including the use of visuals, gestures, graphic organizers, and oral definitions to introduce new vocabulary terms. . . . In addition to language supports, I included multiple means of expression to allow the variety of learners in my class to showcase their learning. For instance, in lesson 3, I planned for students to demonstrate their understanding of the tangram activity through manipulatives, drawings, and verbal responses.</p>

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context for a problem about fractions. Finally, candidates' equitable practices frequently employed the use of multiple representations to broaden students' access to content. For example, one candidate noted that she used "visuals, gestures, graphic organizers, and oral definitions . . . to allow the variety of learners in my class to showcase their learning." Though this example provides different opportunities to represent one's thinking, these strategies do not leverage students' cultural forms of knowledge.

These practices do not appear to align with candidates' conceptualizations of equity. Candidates' enactments were narrowly focused on student thinking and how students experience school and the classroom, demonstrating limited attention to sociopolitical structures, students as cultural beings, and biases toward particular students' capabilities, all of which were dominant themes that emerged from candidates' essays on equity.

With the equity characterizations and predominant practices in mind, we turn to focus on the alignment between conceptualizations and practice for the nine cases and also examine the differences and variation between the two. In doing so, we aim to make visible what it looks like for a candidate to enact a conceptualization in practice as well as misalignment between conceptualization and practice. Together, these cases enable us to consider to what extent candidates' conceptualizations do or do not align with their practice, to gain insight into programmatic coherence.

#### ***Alignment Between Candidates' Conceptualizations of Equity and Their Practice***

We first highlight two instances of alignment between conceptualizations and practice. The two candidates whose conceptualizations aligned with their practice, Aurelia and Marion, conceptualized equity as an understanding of the impact of the broader political context on classrooms and as being aware of teachers' biases toward students.

**Aurelia.** We observed alignment between Auriel's conceptualization of equity and her practice with regard to the ways in which Aurelia conceptualized equity as focused on histories of oppression and the continued marginalization of students of color. She noted that these students' experiences are discounted in schools, citing an example from Moll and colleagues (1992) in which a teacher tells a student of Mexican descent that his travels to Mexico "were not classified as educational experiences by his teachers." She wrote that "this deficit way of thinking about students and their personal experiences is what does not allow the U.S. to have a just educational system." Here she pointed out that this particular student's travels are important to leverage because they position the student's experience as valuable to the classroom and the content.

Evidence of this orientation to students as having cultural assets appeared in her lesson planning commentary as well, writing that her Latinx students "mention



*telenovelas* because it is a norm in their household,” and as a result, she constructed a word problem about fractions using *telenovelas* as the context. Here Aurelia paid attention to the students’ shared cultural experiences that are unique to the Latinx cultural experience and then incorporated this particular experience into the math problem as a context. By making *telenovelas* the context for a problem, Aurelia validated her students’ experiences as relevant to the work of doing mathematics. Aurelia’s conceptualizations of equity pointed out that leveraging students’ experiences from their homes and cultures was not normative and that students’ experiences were often seen as a deficit. We view her specific conceptualization of equity as the marginalization of the experiences of students of color and her attempt to bring those experiences into her instruction as evidence of alignment between conceptualizations and enactment of equity.

**Marion.** Our examination of Marion’s conceptualization of equity juxtaposed with our analysis of her practice revealed evidence of alignment between the two. Marion focused her conceptualization of equity on being aware of biases about students that position students as incapable compared to their peers. In her reflection, she commented,

I also believe a big part of having equity in the classroom is being unbiased about your students’ chances for success. Many teachers will go into the classroom already assuming that certain students are not capable. Teachers can be influenced by the student’s culture, looks, previous teacher comments, amongst many other factors.

Marion described the importance of addressing biases teachers may hold toward certain students to position all students as capable. The alignment between this conceptualization and her practice was found in the tasks for which she held students accountable, implying that both “struggling” and “advanced” students were capable of completing this task. In one instance, she did this by prompting students to use any strategy they could come up with to solve a problem. In response to an edTPA prompt asking candidates to justify how their instructional strategies were appropriate for the whole class and students with specific learning needs, she answered,

In my second lesson, the students will be allowed to choose any strategy they wish to solve the addition problems. . . . I have a wide range of learners in my classroom, and this freedom to choose their favorite strategy allows the higher students to choose a more advanced strategy (such as number bonds), and the struggling students and English language learners can choose one with a more tactile representation, such as building with base-10 blocks.

Marion offered this freedom so that students can enter into the task from a variety of abilities and framed this as an opportunity for struggling students to enter into the problem. In this case, she positioned students as capable of completing the same task as the “higher” students. Marion also found that her “struggling math students . . . [were] enjoying using representations to solve the problems” and that they

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“believed in their own ability more and more to learn mathematics.” Our analysis suggested an alignment between (a) her strategy of implementing rich tasks with all students with no modifications for students who typically “struggle” and (b) her conceptualization of equity that centers a commitment to checking biases so that students are not positioned as incapable.

Though we saw evidence of alignment in these two cases, this was not the case for the additional seven cases whose teaching practices we analyzed. We provide cases of three candidates—Hannah, Magdalena, and Catalina—not only to represent the distinctions between conceptualization and practice but also to see what they came to privilege in their practices as a way to inquire about other aspects of the preparation program that may be influencing their teaching. We selected these three cases because each represented variation in its critical conceptualizations of teaching, yet the teachers did not enact them in practice.

**Hannah.** Hannah’s equity conceptualization highlighted the importance of interrogating resources and supports students receive and need, as they are situated in the institutional program aimed at providing support to students. In her equity essay, Hannah struggled with the services provided to students by the schools’ resource specialist programs (RSPs):

The in-class compare and contrast analysis of the way RSP students were “learning” math and the way the general ed students were learning math provided a glimpse of the way schools have failed to create an equitable learning environment for all students. . . . The RSP students were isolated, merely repeating and copying down procedural steps for math concepts. I’m still not sure I understand how this alternative RSP method is beneficial for these students.

This critique of the kinds of special supports students received highlights Hannah’s focus on both identifying and examining supports for particular students, but also how school programs are enacted to provide support. However, we saw little evidence in her practice related to interrogating or critiquing those supports. Instead, her instructional practice focused on attending to and eliciting student thinking while using visual representations (e.g., hand gestures, color-coded graphic organizers, and manipulatives) to support English learners. For example, Hannah commented on her lesson on naming and differentiating shapes that she color coded a graphic organizer she created with her students to “give English learners a visual indicator that there is a change in information.” In her video clips and commentary, we did not find evidence of Hannah interrogating how these strategies she employs to support her English learners ensure access for students.

**Magdalena.** We now turn to a case of a candidate, Magdalena, whose conceptualization emphasized leveraging students’ assets:

Teachers also view their students as funds of knowledge, in other words they realize that each student holds valuable culturally specific knowledge and skills.

. . . Teachers who really know their students have a better understanding of their needs and can create instruction that is relevant to their lives.

Magdalena's equity conceptualization centers on the need to get to know students personally and draw from their cultural experiences to inform instruction.

However, when the edTPA prompted Magdalena to justify how her understanding of her students' personal, cultural, and community assets informed her instructional decisions, she responded by saying that she incorporated the "shapes . . . found in the area" surrounding the school because many of her students walk to school. She added that the lesson concluded with "a homework assignment in which the students were encouraged to look for shapes in their homes." Although Magdalena's conceptualization of equity centered on leveraging students' cultural assets to inform instruction, her enactment of equity in practice appeared to be a perfunctory attempt to connect learning in school and students' cultural knowledge and practice. The strategy of using a shape in the area and at home is not an authentic connection to cultural assets to understand polygons. In her instruction, Magdalena viewed assets as coming from students' experiences in school, absent students' home cultures. We view Magdalena's equity conceptualization and practice as potentially *misaligned*.

**Catalina.** Catalina's conceptualization of equity centered on broadening classroom participation by structuring classroom interactions so that all students, particularly ones who are shy and quiet, have opportunities to share their thoughts and contribute to the classroom conversation:

If teachers only use whole-class discussions or only call on students who raise their hands, these shyer students don't get the opportunity to share their thoughts and contribute. A way to help these students is to include smaller group discussions or think-pair-share, so that these students have a chance to contribute, but in a less vulnerable environment.

Catalina calls out the use of group work as one strategy for ensuring that "shyer students" are given opportunities to talk about the content in ways that work for them in a more supportive, less threatening environment. Much like the other candidates' instruction we analyzed, Catalina used groups in her lesson. Catalina's instruction focused on eliciting student thinking and pressing students for justification, both in group work and in whole-class discussions. However, her reflection did not provide evidence that she used group work to broaden participation. Instead, her commentary focused on the use of coins as a problem context since her students would become familiar with coins and because the students use classroom currency. Our analysis revealed little evidence of alignment between Catalina's conceptualization and enactment of equity. The use of group work may have been aligned with Catalina's equity conceptualization. However, we did not find evidence of Catalina reflecting on how her instruction did or did not try to broaden participation in her classroom.

The other four cases reflect the lack of alignment between candidates' con-

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ceptualizations and practice. Sandra focused her conceptualization of equity on interrogating the specific supports particular students need to succeed in class, but her instruction focused on emphasizing students sharing their thinking with classmates while positioning students' experiences as coming from their experience in school, particularly drawing on their knowledge of classroom currency. Kathy conceptualized equity as the need to understand the impact of the sociopolitical context within which schools are situated but emphasized the acquisition of academic language and making students' thinking visible to the whole class. Beatriz also emphasized the need to examine the sociopolitical context of schooling but, like Kathy, emphasized the acquisition of academic language while also emphasizing group-worthy tasks to make students' thinking visible to one another. Tonya centered her equity conceptualization on the importance of leveraging students' experiences and cultures. However, her enactment positioned students' assets as coming exclusively from their experience in school. Across these candidates, we see a focus on enacting high-quality tasks and attending to student thinking, with less attention to the substantive contributions of students' cultural assets and the positioning of minoritized students in mathematics and schooling more broadly. We contend that this lack of alignment suggests a lack of programmatic coherence as it pertains to issues of equity. We argue that coherent programs relative to a particular practice or outcome would be evident in what candidates come to understand about teaching, learning, and learners and what they enact in practice. We now turn to situate this finding within the broader teacher preparation literature and offer suggestions for future research.

### **Discussion and Conclusion**

Issues of coherence continue to plague teacher preparation, while program coherence for advancing equity in teacher preparation continues to be underresearched (Cochran-Smith & Villegas, 2015). We argue for a need to examine the alignment between candidates' understanding of teaching and learning and the practices they enact as a type of "outcome measure" to understand program coherence. In this study, we examined candidates' conceptualizations and practices to understand the extent to which a program was coherent for advancing equity. The main findings are that candidates' conceptualizations varied, that considerable overlap among candidates existed in their instructional practice, and, most importantly, that limited evidence of connections existed between most candidates' conceptualizations and their practices.

The variation in candidates' equity conceptualizations is consistent with research about the various ways candidates define and understand equity (Anderson & Stillman, 2013; Mills & Ballantyne, 2016). Additionally, we found that candidates' equitable instructional practices centered on (a) viewing students' assets as coming from their experiences in schools, (b) attending to student thinking, and (c)

using multiple representations to broaden participation. Both attending to student thinking and using multiple representations are widely recognized as essential practices for advancing equity in mathematics (Bartell et al., 2017; Nasir et al., 2014), though they are insufficient for addressing the racialized and politicized contexts that operate on mathematics education (Gutiérrez, 2009; Martin, 2009) because they do not attend explicitly to these contexts. It may in fact be the case that candidates' attention to student thinking and task complexity is a reflection of coherence among other programmatic experiences, including other coursework they took prior to or while completing the edTPA.

Our finding that candidates drew on students' experiences in school, rather than their experiences in their homes and communities, is consistent with previous research that has highlighted the challenges candidates experience trying to surface students' knowledge bases to inform their instruction (Turner et al., 2012). These findings suggest the importance of programmatic alignment not only between courses and instruction but also between courses as they are experienced over time. That is, teacher educators, like practicing teachers, need to make visible to each other the theoretical underpinnings within and across courses and experiences and identify potential points of leverage for advancing teacher preparation toward programmatic aims. Such an effort would extend research on how programs develop knowledge and practice for teacher education and contribute to research on developing a pedagogy of teacher preparation (Grossman & McDonald, 2008).

Finally, our analysis provided limited evidence of alignment between how candidates come to understand equity and the practices they enact for equity. Previous research on coherence has largely examined (a) how stakeholders within programs perceive program components (e.g., fieldwork and coursework) to be aligned with one another (e.g., Heggen & Terum, 2013; Smeby & Heggen, 2014) and (b) the alignment in the ways different program components are enacted (Rojas & Chandia, 2015). Examining program coherence by attending to program components is an important strategy for gaining insight into programs as systems, as a form of what program improvement specialists call a *process measure* (Bryk et al., 2015). This study, however, centered its analysis on the *outcome* of program coherence: how candidates *think about* and attempt to *enact* equity in classrooms. We contrast this orientation to typical modes of research in teacher preparation that decenter the outcomes teacher educators care about most (Cochran-Smith et al., 2015; Diez, 2010). We contend that attempts to make programs more coherent should result in more alignment not between program components but in the way candidates understand, plan for, enact, and reflect on practice.

An important area for research concerns what programs' successful attempts to be coherent look like in relation to candidate outcomes: how they think about and enact practice. In particular, we advocate for a need to attend to candidates' understanding of teaching in relation to *specific* program outcomes (e.g., equity) in conjunction with practice. This involves inquiry into the connection between (a)

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program components—what Bryk, Gomez, Grunow, and LeMahieu (2015) referred to as “process measures”—and (b) what candidates think and what they actually do in classrooms, what are referred to as “outcome measures.” Successful cases that highlight the impact program components have on candidate outcomes is critical for informing the design of teacher preparation programs and for specifying the outcomes around which efforts to improve programs can be organized.

It may also be the case that the program was aligned on other programmatic dimensions besides equity and our analysis did not capture these relationships. While we observed limited coherence in relation to equity, our analysis reveals that candidates were attentive to student thinking and the nature of tasks for supporting student learning. This raises questions about how candidates came to focus on these dimensions. Additionally, candidates’ attention to student thinking and tasks surfaces a need to learn how programs can integrate a focus on equity as tied to mathematics instruction as candidates assume responsibility for teaching. Research has found that teachers can come to frame teaching in terms of programmatic foci (Levin, Hammer, & Coffey, 2009) and connect mathematics instruction to students’ cultural knowledge and practices (McDuffie et al., 2014; Turner & Drake, 2016). Thus one limitation of our study is its focus on a single outcome of teacher preparation: the development of candidates’ dispositions and practices for equity.

Our study highlights the need to attend to what we call “candidate outcomes” to examine to what extent teacher preparation programs are coherent. Fulfilling programmatic aspirations requires defining and centering the outcomes teacher educators and teacher education scholars hope to see. We envision this study as a first step toward understanding how programs can cultivate collective improvement around explicit and shared outcomes.

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**Appendix**  
**Teacher Education Program Commitments**

