

Beyond the Scores:
Using Candidate Responses
on High Stakes Performance Assessment
to Inform Teacher Preparation for English Learners

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Introduction

As the number of English Learners (ELs) nationwide increases, teacher preparation programs must prepare preservice candidates for educating students from a wide variety of linguistic backgrounds (Alexander, Heaviside, & Farris, 1998; Christian, 2006; Fillmore & Snow, 2002; Gándara, Maxwell-Jolly, & Driscoll, 2005; Téllez and Waxman, 2006b; Valdés, Bunch, Snow, & Lee, 2005). Despite productive efforts at preparing teachers for ELs (e.g., de Oliveira & Athanases, 2007; Tedick & Walker, 1995; Stoddart, Pinal, Latzke, & Canaday, 2002), studies show that teachers still lack sufficient training, both nationwide and in states such as California, where ELs represent one-quarter of all the state's students (Christian, 2006; Gándara, Maxwell-Jolly, & Driscoll, 2005). The need for such preparation exists not only in states that have historically had large numbers of ELs, such as California, Texas, Florida, and Illinois, but also in areas with rapidly increasing immigration, such as those in the Midwest and Southern United States (Swanson, 2009).

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In an age of high-stakes teacher assessment, one way to ensure that both individual teacher candidates and their teacher education programs focus on the knowledge and skills necessary to meet the needs of ELs is to require teacher candidates to address these areas on assessments themselves. However, traditional paper and pencil tests of teacher knowledge, which are typical in statewide pre-licensure examinations, rarely capture either the context or the teacher thinking that informs instruction for students (Murnane, Singer, Willet, Kemple, & Olson, 1991). These traditional assessments also often fail to assess candidates' capacities for teaching students from varied linguistic backgrounds (Darling-Hammond & Snyder, 2000). Meanwhile, more authentic assessments, such as teaching portfolios, may fail to meet the high psychometric standards required for high stakes assessment (see Téllez, 1996, for a review). Finally, the most commonly-used means of directly evaluating teachers in the classroom, lesson length observations combined with a checklist of desired behaviors, often result in "abrupt" visits that "are initiated with little sense of the classroom's history" (Gitlin & Goldstein, 1987, p. 7). Indeed, most modern methods for assessing and evaluating teaching leave many teachers and teacher educators nonplussed and unsatisfied.

Assessing the preparation of preservice candidates for quality teaching, both for mainstream students and for ELs, requires reliable and valid assessments that pay close attention to context, process, and reflection, factors that traditional evaluations of teaching either ignore or undervalue. In this article, we focus on one high-stakes preservice teacher performance assessment designed to meet these guidelines. The Performance Assessment for California Teachers (PACT), currently used in 32 teacher preparation programs throughout California, is a comprehensive assessment of knowledge and skills in which candidates analyze and reflect on their own instruction and their students' learning during a "Teaching Event" in their student teaching placements. The PACT was recently approved as an alternative to a test developed by the Educational Testing Service (ETS) as a means for candidates to demonstrate mastery of the state's 13 Teaching Performance Expectations (TPEs), a requirement for a state teaching credential (Commission on Teacher Credentialing, 2007). One of the TPEs (TPE 7) requires that candidates "know and can apply theories, principles, and instructional practices for English Language Development leading to comprehensive literacy in English."¹ The PACT, to our knowledge, is the first U.S. preservice performance evaluation required for licensure that sets out to measure teacher candidates' knowledge and skills in the three areas of academic language, language demands, and teaching ELs.

While much of the research surrounding the PACT has been under-

taken to demonstrate its appropriateness as a reliable and valid high stakes examination required for licensing (Chung, 2005; Pecheone & Chung, 2006, 2007; Youngs, Odden, & Porter, 2003), in this article we take a different approach. We examine what can be learned regarding teacher candidates' preparation for working with linguistically diverse students by going beyond the score candidates receive on the PACT rubrics, in order to closely examine how candidates articulate their understandings of the relevant issues. Because the PACT requires candidates to submit a video clip of their teaching, lesson plan documentation, samples of student work, and extensive written description and analysis, the PACT requires of candidates a far more comprehensive analysis and greater depth of reflection than do paper and pencil tests. We suggest that considering teachers' written responses on the PACT can provide teacher candidates themselves, individual teacher educators, and teacher education programs a forum for addressing teachers' preparation for facilitating ELs' mastery of both English and content knowledge.

We document how eight elementary teacher candidates from teacher preparation programs throughout California discussed issues related to language and learning for ELs in their extensive written materials about their teaching and their students' learning submitted as part of their PACT Teaching Events. While candidates for elementary credentials can choose to complete a mathematics or a language arts/literacy Teaching Event, we focused on those candidates who chose mathematics. We focus on mathematics because it is often misunderstood to be a language-free endeavor and because it represents an area in which schools have failed many ELs and other students from non-dominant linguistic backgrounds (Dale & Cuevas, 1987; Lampert & Cobb, 2003; Khisty, 1995, 2001; Moschkovich, 2000, 2002, 2007a, 2007b, 2007c, 2007d; Pimm, 1987; Spanos, Rhodes, & Dale, 1988). Because we were interested in how the PACT provided a forum for the preparation of teachers to meet the needs of students who have traditionally been ill-served by California schools, we chose teacher candidates who had large percentages of ELs and Latino students in their student teaching classrooms. In California, ELs have had access to inequitable and inadequate conditions for schooling, even when compared to other poor and minority students (Gándara, Rumberger, Maxwell-Jolly, & Callahan, 2003). Although ELs in California come from a wide variety of linguistic and ethnic backgrounds, the vast majority are Latinos who speak Spanish as their primary language (Gershberg, Danenberg, & Sanchez, 2004).

We were particularly interested in exploring the PACT as a means to support and evaluate teacher candidates' preparation for working

with linguistically diverse students in a way that *integrates* a focus on issues related to linguistically non-dominant students, rather than having teachers consider these issues as separate, “add-on” concerns that may become marginalized (Bunch, Aguirre, & Téllez, 2008; Valdés et al, 2005). As teacher candidates focus on four central areas evaluated by the PACT (planning, instruction, assessment, and reflection), they are also required to respond to prompts and evaluation rubrics designed to focus specific attention on academic language, language demands of content-area instruction, and the needs of ELs and other students for whom the language of instruction might be challenging.

As we will discuss below, we found that teacher candidates, in response to the PACT prompts, addressed a number of different areas relevant to the instruction of ELs, including the nature of academic language, the role of language in mathematics learning, the language demands inherent in their own instruction, the role of students’ home languages other than English, the challenges inherent in mathematics instruction for ELs, potential instructional supports, and family and community connections. Elsewhere, we have explored the range of ways in which candidates used the PACT to define academic language and discuss the role of language in mathematics teaching and learning (Bunch, Aguirre, & Téllez, 2008). In this article, we focus on how teachers discussed the broader challenges of teaching mathematics to language minority students, as well as what supports they envisioned to be helpful. We argue that the PACT, beyond its function as a high stakes examination used for state licensing decisions, has the potential to provide important information that can serve as formative assessment and feedback for teacher candidates themselves, individual teacher educators, and teacher education programs as a whole.

The Nature of the PACT

Focusing on a “Teaching Event” that consists of a videotaped segment of a lesson along with a variety of supporting documentation and reflection, the PACT requires candidates to demonstrate knowledge in four primary areas: planning, instruction, assessment, and reflection. Candidates must submit a 10-20 minute video of a lesson that took place during the teaching segment they document in the Event, as well as lesson plans and reflections on teaching the entire Event. They also discuss their assessment of student work from the entire class, as well as an in-depth analysis of the work of several individual students, one of whom must be an EL or another student facing linguistic challenges. The teaching portion of the Teaching Event is completed in the candidate’s

student teaching site. Cooperating teachers may assist candidates in organizing lesson segments as well as with other administrative tasks, but the experienced teachers must allow each candidate to complete the teaching and reflection independently. The PACT Handbook contains prompts that help candidates construct their responses and guides candidates through the documentation they need to complete the event, as well as the rubrics used to evaluate them.

Throughout their discussion of each Teaching Event, candidates are prompted to discuss ELs, the language demands of instruction and assessment, and academic language in particular. In fact, every section of the PACT includes prompts about language and language learners. These include prompts such as the following:

- How do key tasks in your plan build on each other to support student learning of the curriculum content and the development of academic language related to that content?
- When you consider content learning of your students and the development of their academic language, what do you think explains the learning or differences in learning that you observed during the learning segment?
- Describe any language supports used to help your students (including English learners as well as other students struggling with language) understand the content/or academic language central to the lesson.

In addition to rubrics assessing candidates' knowledge and skills in the four central areas (planning, instruction, assessment, and reflection), two rubrics focus specifically on language issues. First, candidates are assessed regarding their ability to articulate the language demands inherent in their instruction. Second, they must demonstrate an understanding of ways to promote their students' development of academic language in the context of content-area instruction. Unlike the planning, instruction, assessment and reflection rubrics, each of which corresponds to a particular segment of the candidate's written discussion, the language demands and academic language rubrics are assessed across the entire Teaching Event.²

Because widespread consensus does not exist regarding the nature of academic language (see Bailey, 2007; Bunch, 2006; Cummins, 2000; Rivera, 1984; Rolstad, forthcoming; Valdés, 2004), much discussion and debate surrounded the most appropriate way to proceed while designing the PACT rubrics. Ultimately, the rubrics were designed explicitly to move teacher candidates beyond a focus on academic vocabulary alone

and toward viewing language more broadly in relation to the language demands of the curriculum and how students were able to use language to demonstrate what they know and can do (Bunch, 2006; Bunch, Lotan, Valdés, & Cohen, 2005; Valdés et al, 2005). Academic language is described in the '05-'06 PACT candidate handbook as follows:

the language needed by students to do the work in schools. Academic language includes such things as specialized vocabulary, grammar and punctuation, conventional text structures within a field (e.g., essays, lab reports) and other language-related activities typical of classrooms (e.g. expressing disagreement, discussing an issue, asking for clarification). Academic language includes both productive and receptive modalities.

The language demands rubric focuses on students' ability to move beyond surface level grammatical errors and vocabulary to consider the language demands of various oral and written text types. Language demands might include understanding a teacher's oral presentation of information, responding to a question in class, listening to or reading directions, sharing information orally with a partner, and explaining or justifying reasoning orally or in writing. Text types that students might have to comprehend or produce include oral descriptions of mathematical reasoning; written diagrams, graphs, or charts; and various symbolic notations.

Meanwhile, the academic language rubric judges candidates' ability to use scaffolding or other support to provide access to core content while also "providing explicit models, opportunities for practice, and feedback for students to develop further language proficiency related to the demands of the learning tasks and assessments." The goal was to evaluate the use of teaching strategies that promote comprehensibility of instruction without sacrificing access to the core content or opportunities for language development.

Study Design and Methods

The eight candidates' PACT Teaching Events focused on in this article came from a larger sample of 36 Elementary Mathematics Teaching Events requested from the statewide PACT administrative office. The PACT office had collected approximately 200 Teaching Events from participating institutions in all subject and grade areas for five years, primarily for the purposes of providing benchmarks, revising rubrics, and training scorers. We requested Teaching Events representing a range of scores from the two academic years (2004-2005 and 2005-2006) that immediately preceded the onset of our research. We requested that PACT officials include Teaching Events from teacher preparation programs

from what they judged to be diverse geographic locations, demographic contexts served by graduates of the program, and theoretical and pedagogical approaches to preparing teachers for linguistic diversity. The most common program model for universities participating in the PACT is a year-long master degree program that includes a teaching credential, and we expect that campuses of the University of California, the California State University, and private universities were represented in our sample.

From our initial corpus of 36 Teaching Events, we limited the number in order to conduct the in-depth qualitative analyses reported on in this article. We first selected Teaching Events from candidates whose student teaching classrooms had at least 30% ELs, reducing our sample to 17. We chose the somewhat arbitrary 30% threshold because we believed that it would be necessary for candidates in classrooms with approximately one-third ELs to focus extensively on these students, providing the candidates ample opportunity to respond to the prompts. For reasons described earlier, we were particularly interested in teachers' preparation for working with Latino students, so from the remaining Teaching Events we chose to focus on eight candidates whose classrooms had the highest percentages of both ELs and Latino students. (See Table 1 for candidates' self-reported information about the composition of their classrooms and schools.) Among the eight candidates, a variety of grade-level classrooms were represented: one kindergarten (Christine), two first grade (Angela and Denise), two second grade (Belinda and Fiona), two third grade (Elizabeth and Holly), and one fifth grade (Grace).³ While our data did not include the demographic characteristics of the candidates themselves, the videos suggested that all eight were female; seven appeared to be White (non-Hispanic) and one appeared to be of Asian American origin.⁴

In addition to the videos, student work samples, and other supporting materials, the written materials submitted by each candidate averaged 10,000 words. Our analysis focused on the written data and consisted of iterative reviews at various levels (Miles & Huberman, 1994). For the first level of analysis, in an effort to gain an initial understanding of how candidates responded to the prompts, we performed an electronic word search for use of the term *academic language*. We identified every use of the term in each of the eight Teaching Events, annotating each instance with emergent codes and preliminary comments. At least two researchers independently followed this process, coming together to check for consistency, refine codes, and discuss emerging findings.

Both before and during the process of the academic language word search, we found that teachers' discussions of language issues related

Table 1
Teacher Candidates and the Linguistic/Racial/Ethnic Composition
of Their Classrooms and Schools (Self-reported on PACT)

<i>Name</i>	<i>Grade</i>	<i>% EL and Primary Languages in Classroom</i>	<i>Racial/Ethnic Composition (School or Classroom)</i>
Angela	K-1	90% EL Primary language(s) of ELs: Spanish (100%)	School: 66% Latino, 32% African American, 2% Other
Belinda	2nd	75% EL Primary language(s) of ELs: Spanish (100%)	Not Stated
Christine	K	78% EL Primary language(s) of ELs: Spanish (93%), Chinese (7%)	Not Stated
Denise	1st	74% EL Primary language(s) of ELs: Spanish, Others	Classroom: 45% Asian, 35% Hispanic, and 20% White
Elizabeth	3rd	98% EL Primary language(s) of ELs: Not Stated	Not Stated
Fiona	2nd	50% EL Primary language(s) of ELs: Spanish	Classroom: 95% Mexican American, 5% European American
Grace	5th	78% EL Primary language(s) of ELs: Spanish, Tongan, Cambodian	Classroom: 93% Latino
Holly	3rd	60% EL Primary language(s) of ELs English, Spanish, Arabic, Korean, & Vietnamese	Not Stated

to mathematics learning and teaching were not limited to their use of the term *academic language*. To examine their broader discussions, we conducted a more comprehensive analysis of each candidate's entire text for each Teaching Event. We read all written materials submitted as part of the PACT, coding the data, refining the previous academic language category, and identifying other emergent categories (Strauss,

1987). Using this recursive process, we identified a number of non-mutually-exclusive themes, including (a) the role of language in mathematical learning, (b) language demands, (c) the role of students' native (non-English) languages, (d) teaching supports, (e) teaching challenges, and (f) family/community connections. Using category codes for each teacher case, we produced theme summaries and met to discuss and resolve discrepancies in the coding. For the third level of analysis, we developed matrices and other displays to further condense data and draw comparisons across the eight candidates (Miles & Huberman, 1994).

Several clarifications are in order before presenting our findings. Although we watched the videotaped classroom excerpt submitted by each candidate, we did not attempt to compare teachers' written work with our own judgments about their teaching as revealed by the videos. As acknowledged by the design of the PACT, which includes videotaped teaching segments, lesson planning materials, and student work, candidates' written discussions alone cannot be used as a proxy for teaching ability.⁵ Moreover, the PACT was not yet a high-stakes assessment during the time of our research, and candidates' performance during one teaching event of one subject area may not represent ongoing teaching performance. However, the purpose of our research was not to evaluate candidates' overall ability to respond to the needs of ELs, nor to judge the effectiveness of the PACT in assessing this ability. Rather, in an effort to judge the potential for using an assessment such as the PACT as a tool to facilitate the development of preservice teachers' understandings and skills for working with ELs, we were interested in documenting the ways teacher candidates responded to an assessment that asked them to reflect explicitly on language demands, academic language, and ELs in the context of the more global PACT assessment tasks. Because our purpose was not to evaluate the technical aspects of the PACT as a measurement instrument, our data did not include the official score that each candidate received on the various PACT rubrics. Furthermore, because we were not aiming to judge the efficacy of the candidates' teacher education programs, we did not seek external information about candidates' teacher education programs or their experiences in them.

Finally, a word about sample size and data analysis. In order to go "beyond the scores" to examine the extensive teacher narratives of planning and practice called for by the PACT, we chose to conduct qualitative textual analyses in order to evaluate adequately the breadth and depth of the teacher candidate responses. While small sample sizes always raise questions about generalizability, the goal of case study and qualitative approaches is not to generalize to specific populations (Yin, 1994), but rather to identify and explore factors and processes at a fine-grained

level that would not be possible with a larger sample (Strauss, 1987). The methodological approach to analyzing the narratives uncovered emergent categories derived from the data. Understanding how the eight candidates discussed language demands, academic language, and ELs can inform future inquiry on the potential of high-stakes exams such as the PACT to be used as tools for helping teachers prepare to work with ELs.

Findings

In this article, we first focus on how the eight candidates used their written materials submitted with the PACT to discuss the supports they either incorporated into their Teaching Event or identified in their reflections as measures that could have improved their instruction. We then shine light on how the candidates articulated the challenges inherent in mathematics teaching and learning for ELs and other language minority students.

Instructional Supports for Teaching and Learning Mathematics in Linguistically and Culturally Diverse Classrooms

The eight teacher candidates identified and discussed multiple instructional supports used to plan and implement their mathematics lessons and meet the needs of ELs. Based on the candidates' responses, we have organized these supports into several overarching categories, each addressed below. As mentioned earlier, our primary purpose was not to judge whether the particular supports offered by candidates are the most appropriate and effective means of supporting the mathematical education of ELs, but rather to highlight opportunities for assessment and development of their understandings and skills afforded by an evaluation such as the PACT. Nonetheless, it is important to point out that these categories are consistent with research on effective teaching for ELs, both generally (e.g. Echevarria, Vogt, & Short, 2008; Téllez & Waxman, 2006a) and for mathematics in particular (e.g. Gutierrez, 2002; Garrison, Ponce, & Amaral, 2007; Khisty, 1997; Moschkovich, 2007a, 2007b).

Using multiple representations to make language and mathematical concepts comprehensible. The candidates described a wide range of approaches they used in their mathematics lessons to make the delivery of content instruction in English comprehensible for ELs. All candidates described the importance of using multiple representations to model mathematical problems in order to provide a concrete representation of target concepts. Candidates discussed using visual representations, manipulatives (e.g., unifix cubes, play money, and pieces of M&M candy), kinesthetic activities, and role plays. Most frequently, candidates iden-

tified the importance of using various kinds of visual representations to help ELs gain access to and understand the mathematics lessons. Teacher candidates referred to the use of visuals such as pictures and objects to help model specific problems or convey specific examples to students who are learning English.

The teacher candidates' depth of explanations varied for how and why the use of visuals or other representations assisted mathematical learning for ELs. For example, in describing her specific strategy for "using visuals," Fiona indicated she provided students with plastic replicas of coins for a series of lessons on money. She asked students to identify each coin and its value. Reflecting on her lesson, Fiona articulated her belief that the plastic coins would aid students' addition and counting skills:

I believed my plans worked for my diverse population because even though my students spoke no English or rarely any, using math manipulatives really helped. It was a visual for them and also a bridge for the language barrier.

While she suggested the importance of visuals, Fiona did not elaborate on how or why the use of this strategy helped bridge "the language barrier."

In contrast, other candidates provided additional explanation for incorporating the use of specific tools such as graphic organizers or diagrams to help clarify concepts and help make linguistically challenging information more comprehensible. For example, Holly developed a "problem-solving chart and checklist" that students used as a reference during her lesson. She explained that this organizer helped clarify the process of solving word problems and decreased student confusion over "words and all the numbers within the problem itself." According to Holly, the use of this support promoted "greater depth of understanding and higher correct response rate" to word problems for her students.

Other teacher candidates provided even more detailed descriptions and explanations for implementing several such supports simultaneously in order to increase access of the lesson for their ELs. For example, Christine reflected on the "main supportive strategy" she used to make the content accessible to ELs:

... I tried to provide lots of concrete examples for my language learners to see while we talked about them. I think tying together the verbal and visual aspects of knowledge is very helpful when attempting to explain content to my [ELs].

Throughout her lesson on equality, Christine utilized multiple representations to model concepts with her students. Her discussion of her Teaching Event was replete with instructional examples of the atten-

tion to and coordination of multiple direct modeling supports (including physical, visual and verbal modeling) among the students and between teacher and student to facilitate access to the lesson for her EL. Her coordination of concrete examples with visual and verbal “aspects of knowledge” represents an intentional, multi-pronged approach to facilitating mathematics learning among ELs.

Promoting and facilitating the use of mathematical vocabulary and discourse. In addition to supports that were designed to facilitate students’ comprehension of both mathematical concepts and the language used to represent it, candidates’ also focused on supporting ELs’ development and use of the vocabulary and discourse practices valued in mathematical contexts. While the use of multiple representations described above was occasionally portrayed as *reducing* the language demands of instruction, the comments made by candidates regarding fostering their students’ participation in mathematical discussions can be viewed as a means of *extending* students’ use of English for academic purposes.

All eight candidates discussed the importance of focusing students’ attention on mathematical terms that they believed would be challenging for ELs. As we have discussed elsewhere, candidates’ discussion of the nature of the vocabulary challenges and their approaches to supporting their students with these challenges varied widely (Bunch, Aguirre, & Téllez, 2008). Some teachers viewed language demands of mathematics lessons, including developing vocabulary, as minimal because in their view math “focuses on numbers.” Fiona, for example, argued that, by their very nature, mathematics lessons have minimal language demands:

Since this [Teaching Event] is on math, I did not have a heavy emphasis on reading or writing. They did have new vocabulary that they needed to learn which were quarter, dime, nickel, and penny. Regardless of their English proficiency, the math lessons did not require much reading or any sentence writing. Since this was a math lesson, all the students were able to deal and focus on numbers.

According to Fiona, because of the minimal role she perceived language playing in mathematics learning, her ELs would not be hindered. Her focus was on specific vocabulary (names associated with specific coins) and her students’ being able to identify the coin with the appropriate word.

In contrast, the majority of candidates described language as playing an integral role in mathematics learning. They employed instructional support strategies that focused on providing students with multiple opportunities to define and use specific vocabulary and other mathematical discourse practices as part of mathematics learning. For example, Grace

assigned importance to “academic vocabulary” as crucial to mathematics learning, and she emphasized the importance of students’ language development. She described a multipronged approach to helping students acquire this form of academic language, one that required multiple representations and opportunities for students to see and use:

Clearly language development is a key factor in planning for this set of lessons. Introducing new academic vocabulary, I will need to model how to use the terms, define and write the words on the board, allow for repetition, as well as use diagrams and models for visual support as much as possible. It will also be very important to provide students with opportunity to speak using the language in discussion, both within the less intimidating context of partners or small group as well as with the whole class.

Grace was clear that not only was teacher modeling of the definitions and usage of the new vocabulary necessary, but also that this modeling should be done in a variety of ways and contexts that facilitated students observing and using this language to develop mathematical understanding. Interactions included physical and visual modeling by teachers and students, her teacher modeling of the language use or talk, and students engaged in discussions as an opportunity to use the vocabulary in context. These strategies, in Grace’s view, worked in concert to support academic vocabulary development as an inherent part of mathematics learning.

Two candidates, Angela and Christine, went beyond a discussion of vocabulary to include larger discourse practices, such as explanations and justifications, valued in mathematics. Angela pointed out that her first grade lesson on equality included a variety of participation structures (whole group, small group, partners) in order to facilitate “frequent opportunities for interaction and discussion between teacher and student and between students.” Angela clarified the purpose of this interaction as directly related to mathematical conversations: “Math discussions . . . require students to expand on answers, such as ‘why do you think that’ or ‘what do you mean by . . .?’” While she did not discuss explicitly the expectations for answering those questions, she mentioned that “student responses will be paraphrased and re-voiced so that student discourse is clear to the teacher and all students.”

Christine identified a different strategy for supporting her students’ development of mathematical discourse practices. In discussing how she might follow up on her kindergarten lesson on number relationships focusing on greater than and less than, Christine suggested that she should use “sentence frames for students to practice using the academic language in complete sentence format.” Christine described this as an

important and necessary addition to her teaching sequence because “based on my assessments students were able to *verbalize* which group had more, but many of them were not able to *explain* that one group had more because it had more objects than the other group.”

Using a variety of participation structures. Candidates discussed the importance of a variety of classroom participation structures beyond whole class discussions and direct instruction to include partner work and group work. Seven of the eight candidates emphasized partner or group work as a major strategy for supporting the mathematics learning of ELs, but they varied in the extent to which they provided evidence of or a rationale for why this would be helpful. For example, Belinda stated, “Because this class consists of 75% [ELs], I wanted to make sure that I was allowing for partner work accompanied by whole class discussion before I asked students to work independently.” Yet she did not offer a rationale for why such a strategy might be helpful for ELs, nor did she acknowledge the additional language demands that might be inherent in having students work in pairs.

Other candidates discussed their rationale for providing groupwork opportunities, including reducing levels of anxiety among ELs, providing peer language models to negotiate language demands (such as reading), and to maximize mathematical discussion and language practices such as explanation. For instance, Elizabeth articulated the affective benefit of group work for English learners:

The opportunity to work with others is a great technique for [ELs]. This lowers the anxiety and creates a support group for them to learn in. The students can ask questions to their peers, and build their self esteem by participating in a group goal.

Grace went beyond Belinda’s description of the benefit of group work to suggest that this structure can offer support for ELs in communicating their mathematical understandings:

It will also be very important to provide students with (sic) opportunity to speak using the language in discussion, both within the less intimidating context of partners or small group as well as with the whole class. I will implement SDAIE techniques such as language support by having students collaborate with language buddies as a regular part of independent practice time, activate background knowledge, and make grade appropriate content accessible to everyone.

Grace’s planning commentary places importance on a variety of participation structures that create opportunities to use language with sensitivity to promote students’ developing confidence with English language development.

Supporting use of students' native languages. Four of the eight teacher candidates articulated explicit instructional supports that linked to students' native language. It is important to note that none of the teacher candidates reported being fluent in Spanish, the home language of the vast majority of ELs in the candidates' classrooms and throughout California. Furthermore, due in part to an anti-bilingual education referendum passed in California in 1998, limited opportunities existed for the widespread use of students' native languages in elementary classrooms.⁶ Nonetheless, candidates articulated a variety of important native language supports, including utilizing bilingual personnel such as students, cooperating teachers, or para-professionals to help translate or clarify activity instructions or answer questions for ELs; providing Spanish-translated mathematics texts and materials for students; incorporating specific strategies such as word walls to highlights vocabulary usages in two languages; and connecting to cognates of words in English and Spanish (e.g. quadrant and *cuadrado*).

For example, Belinda utilized several native language supports to help make the lesson more accessible to ELs. Even though she did not speak Spanish herself, she made available Spanish textbooks, showcased vocabulary in two languages with word walls, and provided instructions in both languages so that her English would not be a barrier to learning. She stated in her planning commentary "we will read the directions together as a class in both languages, then discuss exactly what they are asking us to do, while looking at the example given."

Grace provided another example of tapping into students' primary language as a mathematical resource to facilitate learning. In a lesson that reviewed features of lines and graphing in the coordinate plane, Grace connected the English word of quadrant to the Spanish word *cuadrado* (square) to support her students' language development.

Particularly in the first clip, I focus a lot of attention on providing my students, the majority [ELs], with language support. As I refer to the word quadrant while defining the coordinate plane, I point to the quadrants on the overhead so students have a visual reference. I also reference my students' primary language knowledge, connecting the English word quadrant with the Spanish word cuadrado [sic].

It is important to note that Belinda and Grace incorporated strategies that view primary language as a resource rather than a barrier to mathematics learning and English development. In the context of California's restrictive language policies related to English instruction, these two candidates provide instructional support that affirm students' primary language and support its use in facilitating mathematical

learning. On the other hand, relying on native language support in the absence of other language supports can be problematic in English-medium classrooms. Fiona, for example, relied heavily on the use of translation, either from her cooperating teacher or from bilingual students in the class. Unlike Belinda and Grace, however, Fiona provided little evidence of her own ability to provide such support, nor of her use of a wide range of strategies that would help foster her students' ability to develop the English language skills necessary to begin to engage in mainstream mathematics instruction. This may in part be associated with her view that language plays a minimal role in mathematics lessons because it is about numbers, not reading or writing. She highlights the need to translate what minimal language there is rather than to focus on language development and mathematical discourse practices such as explanation and justification as part of learning mathematics.

Connecting to student experiences and community knowledge. Half of the candidates explicitly discussed how they built upon students' previous experiences and community knowledge to support mathematics learning with ELs. This strategy often worked in conjunction with other instructional supports to facilitate learning. For example, Belinda taught in a classroom with students from Mexico and El Salvador. In preparing for a measurement lesson, Belinda described the importance of connecting student knowledge about measurement from their experience in other countries and comparing to the measurement system in the United States.

It is important for students to understand that in the United States, we use different units of measurement than other countries. . . . We will discuss that it is important for them to be able to use both, depending on where they are in the world. Since some of the students have actually lived in another country, it is important that we address what they already know and what they need to know to be able to measure here in the U.S.

Belinda provides an instructional support in this lesson that builds on student mathematical knowledge and experience in their home countries. The students' mathematical knowledge and experience is both validated and used as a resource to help them learn new and related mathematical concepts and procedures.

Angela also utilizes student experience and community knowledge in planning a lesson on equality. In this description, she distinguishes the importance of utilizing a familiar context to assuage possible linguistic confusion for her English learners:

The words "equals" or "equality" are likely to be difficult or confusing

for this class of mostly [ELs]. The word is not used frequently in social contexts, but is used infrequently in real-life contexts that involve measurement (such as cooking). The idea behind “equals” or equality, however, is something students are very familiar with. Students at this age, as mentioned earlier, are very fixated on what is fair. They are quick, for example, to identify if they don’t receive the same amount of snack, if someone is called upon more than others, or if one student gets to do something that others don’t get to do. They understand fairness in the context of sports games, and so the analogy of a soccer game is a model that students can easily identify with.

Here, Angela distinguishes students’ ability to *understand* a concept from being able to *articulate* that concept in English. Her strategy for her lesson on equality builds on students’ experience and knowledge of equality as “fairness” and not on students’ familiarity with the English words *equals* or *equality*. She thus integrates a variety of instructional supports that validates student knowledge and experience as resources for mathematics learning and pays specific attention to the English language development of her students.

The Challenges of Teaching and Learning Mathematics in Linguistically and Culturally Diverse Classrooms

As they discussed their experiences planning, teaching, and evaluating student work from their Teaching Event, candidates represented the nature of the challenges inherent in the teaching and learning of mathematics in linguistically diverse classrooms in different ways. As discussed earlier, candidates varied as to whether and how they viewed language demands, either English itself or the language of mathematics in particular, as “language barriers” for ELs, and how they attempted to support ELs. Beyond language, however, candidates also described other kinds of challenges facing them and their students.

Students’ attributes and behaviors. Two candidates represented the challenges of mathematics instruction for ELs and Latinos as residing in the students themselves, due to what candidates portrayed as either students’ inherent limitations or misguided behavior. Holly repeatedly highlighted her third grade students’ “laziness” as the underlying challenge to their success in mathematics, such as in the following statement: “While this learning segment focused on division, it appears to be the laziness and lack of attention that has produced so many incorrect responses, as many did not show their work they were doing in an effort to get the test off of their desks.” Similarly, Fiona attributed her students’ problems to their own behavior: “considering that I have students who are Beginner, Early Intermediate and Intermediate [ELs], I can expect

that my students will have problems completing the assignment and/or rush through the assignment making simple errors.” Several assumptions underlie Fiona’s statement. First, she seems to attribute students’ “rushing” and “making simple errors” to the fact that they were ELs. More broadly, she assumes that students’ predicted difficulties were not to be attributed to the instructional context, but rather to their deficiencies or carelessness. In reflecting on her lesson, Fiona makes this latter point even more explicitly: “in my observations I noticed that students who scored low on their assignments were a result of their *natural low skills*, or they *rushed* through the assignment *making simple mistakes*” (emphasis added).

Parental or familial support. Several candidates attributed some of the challenges to what they perceived as lack of parental or family support. For example, Angela attributed students’ problems to the lack of linguistic and academic resources available in their households and communities:

This school is largely located in a lower income neighborhood *where students have less than ideal resources for home and community involvement in education*. More than 50% of the parents in this school did not complete their high school education. Most families in the school speak predominantly Spanish at home. (Emphasis added.)

While Angela’s comments above emphasize the deficits she perceives in the resources of low-income, Spanish-speaking communities, we pointed out earlier in this article the fact that Angela also attempted to draw on her students’ background in order to introduce her lesson on equality.

Grace, while also focusing on the family backgrounds of her students, placed the responsibility on herself as a teacher to help prepare students for their school-based assignments. She maintained that many parents speak only a little bit of English, “so it is imperative that I provide students with adequate understanding of directions and procedure, enabling them to practice the reinforcement activities independently.” Here, in contrast to candidates who used what they perceived to be deficits in students or their families to distance their own impact as teachers, Grace places the responsibility on herself to help facilitate students’ doing the homework that she herself assigned.

Instructional contexts. Several teachers described the challenges as residing not in the students or their families and communities, but rather in the instructional contexts in which students were attempting to learn mathematics. Denise, while attributing some of her students’ mistakes to “carelessness,” also attributed the problem to her own classroom management: “I was so absorbed in working on problems on the

overhead, that I forgot to monitor the students to make sure they were watching what I was doing or that they were on task.” Elizabeth, on the other hand, argued that attempting too many different “activities” in her lesson led to the fact that “at times students missed out on the time to work on more challenging [tasks]” such as “larger Math problems” or “comprehension problems.” Therefore, the challenge as Elizabeth described it was not that something was wrong with the students, but rather that the lesson prevented students from having access to more time for more challenging work.

As discussed above, Grace identified parental English language limitations that needed to be considered to support her EL students. However, she also attributed the difficulties of some of her English learners to an instructional context that had not given them the opportunity to practice the skills they were being asked to perform:

Throughout the year, I have observed that my students have little opportunity to express math ideas in writing . . . The writing prompt asking them to explain their ideas is therefore an unaccustomed task . . . Word problems are generally more difficult for the majority of the class, but asking them to write about math added another layer of difficulty.

In sum, the candidates attributed the difficulties they faced in the development and delivery of their mathematics lessons to a variety of sources. While deficit views about students, families, and communities were prevalent, some teacher candidates also demonstrated critical reflection on the instructional context for which they had responsibility and could locate instructional strategies that may have also contributed to student difficulties apparent in the mathematics lessons. The PACT, therefore, represented a potential vehicle for teacher educators to consider and evaluate these comments, both for assessing their own efforts as teacher educators as well as for envisioning ways to work with teachers on developing their understandings.

Discussion and Conclusion

In responding to PACT prompts that called upon them to integrate a focus on language demands, academic language, and ELs with their discussion of lesson planning, teaching, and evaluating student work, teacher candidates articulated a variety of understandings and advocated for a variety of instructional supports. As mentioned earlier, many of these understandings and supports articulated by the candidates align with those reported in the literature as facilitating learning for ELs, particularly in mathematics. For example, all teacher candidates described the importance of using multiple representations to model mathemati-

cal problems to maximize the lesson's accessibility to EL. Candidates also discussed the importance of modeling and encouraging the use of mathematical language in the classroom, whether it be particular terms or broader discourse used for explanation and justification. Half of the teacher candidates described strategies that built upon students' native language and community knowledge as resources rather than barriers for mathematics learning. Additionally, several candidates discussed academic language as involving disciplinary-specific discourse practices rather than vocabulary alone. While evaluating teachers' understandings and ability to incorporate those understandings into classroom practice requires additional analysis, candidates' written responses on the PACT provide nuanced examples of how the PACT prompted preservice teachers to articulate the nature of the language and discourse demands inherent in mathematics instruction, as well as how they envisioned opportunities for language development.

At the same time, candidates discussed the instructional challenges that they believed impacted the effectiveness of their lessons and their students' ability to learn. Deficit views connected to students' behaviors, home languages, and families and communities persisted in the narratives of some PACT responses. In some cases, parents were positioned as ineffective sources for mathematics or English language development. On the other hand, candidates like Belinda worked hard to incorporate community funds of knowledge about measurement as both a mathematical leverage point as well as an important source to contrast, given the new learning context in the United States. Meanwhile, Grace demonstrated mixed views of the roles native language and communities have as mathematics resources. She provided a more critical reflection of her instructional context and missed opportunities for which she had responsibility. Grace's response reflects a more critical awareness of her own role in instruction and an emergent yet fragile movement away from deficit thinking about the role of language and mathematics learning for ELs. Finally, Angela, while expressing deficit views regarding students' community and family knowledge, also articulated ways in which she tried to link her instruction to students' background knowledge.

As we analyzed the PACT responses, it became clear that requiring preservice teachers to engage in a comprehensive assessment of their teaching did not mean that they had to sacrifice an authentic reflection of their developing knowledge and skills. Nor did requiring a focus on language, mathematics, and ELs mean that candidates simply had to recite a list of "strategies" from a textbook. It is hard to imagine a traditional paper and pencil assessment promoting these kinds of deep

and broad discussions about preservice teacher candidates' developing knowledge and skills related to the instruction of ELs. We believe that a serious focus on the challenges inherent in teaching and learning mathematics in languages students do not speak at home, as well as an exploration of the means by which to meet these challenges, ultimately serves teachers' ability to reflect upon and effectively teach ELs.

It is important to point out that this study is only a first step toward understanding how high stakes performance assessments such as the PACT might be used to promote the preparation of teachers for working with ELs. Future research is necessary in a variety of areas. First, disaggregating candidates' responses by the sections of the PACT, targeting planning, instruction, assessment, and reflection, can provide important sites of inquiry for teacher educators interested in developing method course activities and field placement experiences for preservice teachers that address specific instructional needs of ELs. In addition, it would be helpful to consider how teachers' perceptions of the language demands of mathematics instruction vary according to grade-level and mathematical topics.⁷ Research is also needed on the time, expertise, and other resources required by already overburdened and underfunded teacher education programs to effectively implement the PACT, both to fulfill its high stakes role and for more formative information regarding the preparation of teachers for educating ELs. Finally, making judgments regarding the efficacy of the PACT for evaluating preservice candidates' teaching skills requires a more comprehensive analysis of the full range of materials submitted as part of the PACT, including candidates' videotaped teaching excerpts, as well as information about these candidates' teaching and their students' learning as they begin their teaching careers.

Nonetheless, the findings discussed in this article suggest several practical implications for using the PACT and going "beyond the scores" in teacher education programs. First, individual candidates and teacher educators can use the entire PACT, both the written responses as well as videotaped instruction and student work samples, as a formative assessment tool to document and discuss the progress candidates have made and to identify areas for further growth. Program-wide, analyzing the PACT Teaching Events can also shine light on the spectrum of ways in which candidates across an entire class, cohort, or program are prepared for working with ELs, facilitating opportunities for program self-assessment (Darling-Hammond, 2006). Considering candidates' work on the PACT could also serve as a forum for teacher educators who play different roles in teacher education programs (clinical and research faculty, teacher supervisors, perhaps even cooperating teach-

ers from candidates' student teaching placements) to come together to discuss shared or divergent understandings of the goals of their teacher education endeavors and how preservice candidates are progressing. In many ways, analyzing the PACT responses reminded us of the case study methods that teacher educators have advocated for more than two decades (Shulman, 1992). Indeed, we believe that requiring contextually sensitive performance assessments such as PACT could spark a revival in this orientation toward evaluating and supporting teachers' development, and we would welcome such a renaissance as one step in promoting improved teacher preparation for meeting the needs of ELs and others from linguistically and culturally diverse backgrounds.

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Notes

¹ See <http://www.ctc.ca.gov/educator-prep/TPA-files/TPEs-Full-Version.pdf>.

² Each rubric is scored on a 1-4 scale, yielding a range of 11-44. While the scoring system overall and the setting of a cut score for passing has been a chief effort of the PACT working group, in this paper we limit our discussion to the content of teacher candidates' responses and not to the technical measurement issues.

³ All names are pseudonyms.

⁴ Recent figures show California's overall teaching force self-identifies as almost three-quarters non-Hispanic White (72%), approximately 16% Hispanic, 7% Asian, 5% African American, 1% American Indian/Alaska Native, and 1% "multiple races" (Commission on Teacher Credentialing, 2008).

⁵ The problem of writing bias is a key concern for raters of any written performance assessment of teaching (Szpara & Wylie, 2005). Preservice teachers who possess superior writing skills may be capable of portraying their instructional skills in a way that biases readers' or scorers' judgments, thus overestimating their true teaching capacity. On the other hand, the skills of candidates whose writing skills are less developed might be underestimated.

⁶ Proposition 227 states that, with certain exceptions, instruction in Cali-

for California public schools for ELs must be delivered “overwhelmingly” in English.

⁷ For example, the demands of the language needed for academic work increases as students’ progress through the grade levels (Bielenberg & Wong Fillmore, 2004-2005). At the same time, as described by Angela and Christine when discussing their PACT Teaching Event, younger ELs also face significant language demands.

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