A Proposed Pedagogical Approach for Preparing Teacher Candidates to Incorporate (Academic) Language

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Context

The edTPA is a performance-based assessment that aims to measure teacher candidates' readiness for teaching. Beginning in the fall of 2015, this assessment will be a mandatory requirement for those seeking certification in Georgia. General agreement exists in the field of education about the basic knowledge and skills essential for beginning teachers to demonstrate in classroom teaching. Does edTPA measure the knowledge and skills essential for beginning mathematics teachers in particular? Assuming that edTPA can successfully measure that knowledge and skills for beginning teachers, the use of the assessment could be valuable.

One of the critical components of edTPA is academic language. Academic language is the formalized language of school to help students communicate, define and form concepts, and construct knowledge (Gottlieb & Ernst-Slavit, 2014). According to World-Class Instructional Design and Assessment (WIDA), emphasis on academic language will also benefit linguistically diverse populations of students because academic language is "a vehicle for communicating and learning within sociocultural contexts; the interaction between different situations and people in the learning environment (WIDA, 2014, p. 4)."

In edTPA, teacher candidates should demonstrate how they create opportunities (i.e., language functions) for students to use academic language such as vocabulary, syntax, and discourse to achieve the learning objective. As teacher educators, it is our responsibility to

prepare our candidates for the edTPA by preparing them to support their students' mathematics learning through these language demands.

Purpose

Beginning in 2012, our teacher preparation program implemented an edTPA pilot study. A faculty member who has extensive experience of scoring edTPA and is fluent with edTPA's operational language on academic language has contributed heavily to our understanding of the instrument and the creation of curricular materials and strategies to improve preservice teachers' learning on academic language. In working to develop shared understandings of academic language for teacher candidates, we asked ourselves: What specific edTPA standards are related to academic language? How do we address these standards in our methods courses and offer opportunities for teacher candidates to understand, identify, and support the importance of language demands associated with mathematics learning tasks for middle school students? How do we help candidates reflect on their instruction, identify evidence, and describe the way the learning tasks and their support are instrumental for students to use language and develop content understanding through their appropriate use of the vocabulary, syntax, and discourse of mathematics?

In this article, we want to share our practices for developing middle grades teacher candidates' knowledge and use of academic language within the framework of edTPA. This paper includes a brief overview of edTPA framework on academic language and a discussion of the elements of language demand as operationalized in edTPA. We intend neither to claim our approach as effective pedagogical practice models, nor to theorize the process of incorporating academic language into instruction. Instead, we propose a pedagogical approach based on our

experience with teacher candidates in middle grades teacher education program course work and our knowledge of edTPA academic language standards.

Elements of Academic Language as Framed by edTPA

The edTPA for middle school (and secondary) mathematics outlines four specific ways that students will use academic language. According to edTPA, academic language consists of several components: vocabulary, language function, discourse, and syntax. Vocabulary, as operationalized in the edTPA, includes terms with definitions that are specific to mathematics, such as parallelogram and with math-specific meanings that may be used extensively in general language or other subjects but have a precise meaning in mathematics such as line or factor (for more see Thompson & Rubenstein, 2000). Teacher candidates are expected to provide opportunities for their students to use vocabulary in their learning to represent their knowledge and to develop mathematical concepts (Thompson & Rubenstein, 2000). Language function (Hill-Bonnet & Lippincott, 2010) refers to ways (e.g., classifying, describing, explaining, interpreting, comparing) to engage students in using language to achieve content understanding. In the edTPA support document titled, "Making Good Choices (SCALE, 2013)," language function is defined as "basically the PURPOSE or reason for using language in a learning task." The edTPA requires teacher candidates to specify the language function in a written objective or learning outcome. Discourse refers to classroom discussion with certain norms specific to mathematics (Moschkovich, 2007), which provide accepted ways for students and the teacher to ask questions to clarify ideas and have opportunities to explain their thinking and listen to the explanations of others. Finally, syntax refers to how the language of mathematics, including symbols, notations, expressions, and sentences, has a set of conventions for expressing ideas, including symbols, words, and phrases (Kersaint, Thompson, & Petkova, 2009). For example,

the syntax for representing all real numbers that are greater than 2 symbolically is $\{x|x \in R, x > 2\}$. Students need to know the differences between $\sin^2(x)$, $\sin(2x)$, and $2\sin(x)$. Only with an understanding of the syntax of mathematics can a student make sense of the following sentence: The vertex form of a quadratic function $f(x) = ax^2 + bx + c$ with $a \neq 0$ is equivalent to $f(x) = a(x - h)^2 + d$.

What We Did with Our Teacher Candidates

How can teacher candidates implement an activity in which students use academic language and language demands are addressed meaningfully? In edTPA, teacher candidates are asked to identify language functions as part of learning objectives in their lesson plans and ensure the lesson segment involves the intentional use of vocabulary, syntax, or discourse, as well as facilitates learning to achieve the objective. Our approach, (see Table 1) scaffolds candidates in recognizing the potential of instruction when they attend to the role of language in learning mathematics, making explicit the language-embedded pedagogy integrated into learning tasks in lesson planning, and considering effective ways to support students' language use.

During the methods course, we provided multiple opportunities for teacher candidates to review learning objectives and identify those that use language as key process. Additionally, we revisited the basics of writing effective learning objectives ("Learning Objectives," 2004) so that candidates were able to compose an objective using a verb and a stem and considered the desired product, process, or outcome as they wrote objectives. Then, teacher candidates analyzed learning objectives (see Figure 1) in terms of language function (verbs) and content stem (stem + process + product).

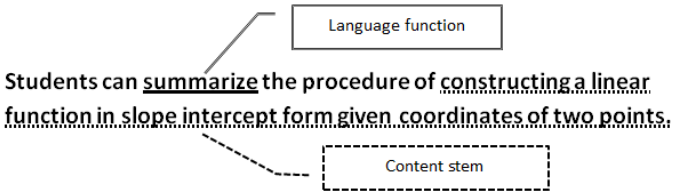

Figure 1. A sample learning objective with language function and content stem.

As for developing the awareness of teacher's role to support students use of language in achieving the learning objective, our approach (see Table 1) was to help teacher candidates select or design tasks that first enable their students to use language and second facilitate the learning (i.e., the doing) tied to the objective. The language demand is such that "the doing" should involve the use of language (vocabulary, syntax, and discourse). Teacher candidates in our program received instruction on academic language during their methods course and student teaching and were to apply that knowledge in their clinical yearlong placements.

Table 1

Summary of Activities to Prepare for edTPA's Academic Language

The edTPA requires the teacher candidate to:	Our program provided learning opportunities for the teacher candidate to:
Understand the elements of academic language and their importance in effective instruction.	• Review communication as a process standard of NCTM • Review the elements of academic language as defined by edTPA and provide definitions, examples, or counter-examples. • Read articles on academic language including language

	needs and classroom discourse. We recommend: o Conceptualizing Academic Language (Solomon & Rhodes, 1995) o "The Language of Mathematics": Towards a Critical Analysis of Mathematics Texts (Morgan, 1996) o Learning Mathematics Vocabulary: Potential Pitfalls and Instructional Strategies (Thompson & Rubenstein, 2000) o Word, Definitions, and Concepts in Discourses of Mathematics, Teaching, and Learning (Morgan, 2005) o Examining Mathematical Discourse Practices (Moschkovich, 2007) o Let's Talk: Promoting Mathematical Discourse in the Classroom (Stein, 2007) o The Language and Grammar of Mathematics (pp.8-16) in The Princeton Companion to Mathematics (Gowers, Barrow-Green, & Leader, 2008) o Unpacking the Language Purpose: Vocabulary, Structure, and Function (Fisher & Frey, 2010) o The Academic Language of Mathematics (chapter 1) in The SIOP Model for Teaching Mathematics to

	English Learners (Echevarria, Vogt, & Short, 2010)
Identify various language demands related to learning tasks and provide ways to support the use of academic language	• Focus on identifying and developing learning tasks in which students have opportunities to use academic language • Write learning goals that explicitly describe ways (e.g., explain, compare, prove) students use academic language in the tasks • Describe language needs demonstrated by individual students or groups and discuss ways to support their needs
Analyze and comment on their students' use of language to develop understanding	• Identify evidence of students' use of academic language • Articulate how students use language and develop content understanding • Reflect on case studies in which teachers provide rich opportunities for language use and attend to students' needs associated with language

Sharing Our Concerns about Academic Language with edTPA

Although we are committed to preparing our PSTs to be successful with any performance assessments, it is important to have a balanced perspective and make informed instructional decisions in teacher preparation programs. In particular, we have some concerns regarding the ways edTPA incorporates academic language. First, the emphasis on syntax is more appropriate for writing mathematics often reserved for more advanced mathematics courses. Second, although language facilitates learning, that learning is often the outcome of a carefully

orchestrated classroom discourse, and it is challenging for beginning teachers who have little classroom experience to become skilled at the nuances of incorporating academic language for productive discourse. Third, the research about use of (academic) language to enhance content understanding especially by incorporating language functions or syntax in lesson design framework is currently limited. This, in turn, makes us question why edTPA, a high-stakes assessment tool, should so heavily prioritize academic language as an assessment standard in their instrument, particularly in mathematics.

Closing Words

In the short run, our research interest includes reviewing edTPA scores of our teacher candidates – our current data were not large enough to make meaningful analysis – and examine the effectiveness of our pedagogical approach.

In the long run, our field needs research that examines the supposition that academic language is an essential teaching skill to require for beginning teachers. With the aim of bridging the gap between standards and their implementation, the National Council of Teachers of Mathematics (2014) recently presented eight research-based mathematics teaching practices and recommendations in Principles to Actions. These practices reflect key practices for mathematics teachers to implement in classrooms. Some key ideas from these eight teaching practices include mathematics goals, reasoning, problem solving, mathematical representations, meaningful mathematical discourse, purposeful questions, procedural fluency, conceptual understanding, productive struggle, and evidence of student thinking. Therefore, future research should investigate the degree to which academic language contributes to the teacher's efforts to implement these key practices in classrooms.

References

Echevarria, J., Vogt, M. E., & Short, D. (2010). The SIOP model for teaching mathematics to English learners. Boston: Allyn & Bacon.

Education Oasis [Web log post]. (2014, August 5). Retrieved from http://www.educationoasis.com/curriculum/LP/LP_resources/lesson_objectives.htm

Fisher, D., & Frey, N. (2010). Unpacking the purpose: Vocabulary, structure, and function. TESOL Journal, 1(3), 315-337.

Gottlieb, M., & Ernst-Slavit, G. (2014). Academic language for diverse classrooms: Definitions and contexts. Thousand Oaks, CA: Corwin.

Gowers, T., Barrow-Green, J., & Leader, I. (Eds.). (2008). The Princeton companion to mathematics. Princeton: Princeton University Press.

Hill-Bonnet, L., & Lippincott, A. (2010). Academic language: PACT [PDF document]. Retrieved from http://www.pacttpa.org/_files/Implementation_Conference_2010/Academic%20Language%20101/Academic%20lang%20101.pdf

Kersaint, G., Thompson, D., & Petkova, M. (2009). The nature of mathematics language. In Teaching mathematics to English language learners (pp. 46-52). New York, NY: Routledge.

Morgan, C. (1996). The language of mathematics: Towards a critical analysis of mathematics texts. For the Learning of Mathematics, 16(3), 2 – 10.

Morgan, C. (2005). Word, definitions and concepts in discourses of mathematics, teaching, and learning. Language and Education, 19(2), 102-116.

Moschkovich, J. N. (2007). Examining mathematical discourse practices. For The Learning of Mathematics, 27(1), 24-30.

National Council of Teachers of Mathematics (2014). Principles to actions. Reston, VA: NCTM.

SCALE. (2013, October). Making good choices: A support guide for edTPA candidates. Retrieved from

http://www.edtpa.com/Content/Docs/edTPAMGC.pdf.

Solomon, J., & Rhodes, N. C. (1995). Conceptualizing academic language. National Center for Research on Cultural Diversity and Second Language Learning. Washington, DC.: Center for Applied Linguistics.

Stein, C. (2007). Let's talk: Promoting mathematical discourse in the classroom. Mathematics Teacher, 101(4), 285-289.

Thompson, D. R., & Rubenstein, R. N. (2000). Learning mathematics vocabulary: Potential pitfalls and instructional strategies. Mathematics Teacher, 93, 568-574.

World-Class Instructional Design and Assessment. (2014). The WIDA standards framework and its theoretical foundations. Madison, WI: Board of Regents of the University of Wisconsin System.