

# Developing Intersectional Competence in the Mathematical and Physical Sciences

Mildred Boveda<sup>1, a)</sup>

<sup>1</sup>Arizona State University, Mary Lou Fulton Teachers College, Division of Teacher Preparation, PO BOX 871811  
Tempe, AZ, USA 85287-181

<sup>a)</sup>Corresponding author: [mboveda@asu.edu](mailto:mboveda@asu.edu)

**Abstract.** Intersectional competence captures educators' awareness of how sociocultural markers of difference simultaneously intersect within the P-12 school context. Findings from a mixed-methods sequential exploratory study established, in part, the theoretical and quantitative basis for validating the Intersectional Competence Measure (ICM). This presentation described the process by which the items for the instrument were created, and how the two subsets of the ICM culminated to a narrative about a young boy having difficulties in mathematics. Boveda discussed the eight indicators of intersectional competence and made connections to their relevance in Discipline Based-Education Research.

## SITUATED KNOWLEDGE AND EMOBODIED EXPERIENCES INFORMING INTERSECTIONAL COMPETENCE

I situated my knowledge (Haraway, 1998), and describe how my mother's transgenerational and transnational stories helped me understand where I stood, even when faced with racism, anti-blackness, colorism, and classism in an urban school setting (Boveda, 2019, Boveda & Bhattacharya 2019). I described how a childhood in South Florida, and frequent visits to the Dominican Republic, also gave me a global perspective on class and poverty that was not necessarily discussed in school. After sharing Mami's stories, and my personal memories, participants and I discussed which sociocultural categories were most salient or prominent. The participants also identified which markers made me "other" or "different" when compared to dominant marker identity for each sociocultural category.

In addition to my childhood and P-12 experiences, I also shared how the ways I was socialized as a special educator and teacher educator reinforced a narrow perspective on the terms "diversity" and "inclusion"—one that privileged dis/ability (Boveda, Reyes, & Aronson, 2019). Despite my embodied experiences as a U.S. born Black woman with familial ties to the Global South, I had moved away from a more robust discussion about difference until coming across Patricia Hill Collins at a conference.

### Intersectionality's Black Feminist Origins

Intersectionality, as conceptualized by Black feminists such as Kimberlé Crenshaw and Patricia Hill Collins, underscores the complexity of interlocking systems of privilege and oppression (racism, sexism, nationalism, religious bigotry, heterosexism) and the necessity of moving away from one-dimensional analyses of identity-based oppression. In developing the Intersectional Competence Measure (ICM), I turned to "intersectionality as a lens for conceptualizing diversity and equity (Collins, 1990; Crenshaw, 1989) to examine how *markers of difference*—or minoritized categories of race, gender identity, linguistic origin, age, socioeconomic status (SES), class, ethnicity, dis/ability, religion, sexuality, nationality, or citizenship— simultaneously intersect within the P-12 school context" (Boveda & Aronson, 2019, p. 249).

## **Imperialist White Supremacist (Ableist) Capitalist Patriarchy**

Given my role as an education researcher, my situated knowledge, and my familial ties to the Dominican Republic, bell hooks use of the phrase *imperialist white supremacist capitalist patriarchy* is critical to understanding what continues to anchor my efforts to validate the ICM:

I wanted to have some language that would actually remind us continually of the interlocking systems of domination that define our reality and not to just have one thing be like, you know, gender is the important issue, race is the important issue, but for me the use of that particular jargonistic phrase was a way, a sort of short cut way of saying all of these things actually are functioning simultaneously at all times in our lives and that if I really want to understand what's happening to me, right now at this moment in my life, as a black female of a certain age group, I won't be able to understand it if I'm only looking through the lens of race.

(hooks, 1997)

Ongoing efforts to develop the ICM in the United States thus necessitates de/colonial approaches given the multiple colonial and imperial histories of different regions of the country (Boveda & Bhattacharya, 2019). Also note that ableism—that is, the oppression based on perceived or actual dis/ability—is interconnected with colonialism (Grech, 2015) and white supremacy (Aronson & Boveda, 2017). The conference proceeding, focuses on the initial item developments and validation efforts for the instrument with participants in Miami, FL.

### **MEASURING INTERSECTIONAL COMPETENCE**

Findings from a mixed-methods sequential exploratory study established, in part, the theoretical and quantitative basis for validating the ICM.

#### **Why Intersectional Competence?**

1. I recognized a need for a shared language about diversity across education equity communities (e.g., special education, bilingual education, urban education, rural education, multicultural education).
2. There were epistemological and ontological considerations for taking a measurement approach: Intersectional competence always existed, but the construct had not yet been named or captured by dominant research agendas.
3. The intersectional competence construct and the instrument are a response to calls to take intersectionality from its theoretical origins to practical considerations (Collins, 2015).

#### **Methodology**

The purpose of the study was to develop an instrument with acceptable standards of validity and reliability estimates for measuring preservice teachers' understanding of intersectionality. The instrument is intended to measure teachers' intersectional competence, that is, their understanding of diversity and how students, families, and colleagues have multiple sociocultural markers that intersect in nuanced and unique ways. In the qualitative phase, the researcher began by collecting data that strengthens the theoretical basis for validating the instrument (i.e., interviews with focus groups, consulting with experts, and cognitive interviews or pre-testing). The second stage of the study involved the quantitative analysis of the results of pilot testing the items in subsets A and B. There was a total of 32 preservice teachers and six expert panel members who participated in in the qualitative phase. There was a total of 107 participants who took the pilot ICM in the quantitative phase.

#### **Indicators**

The following eight indicators of the intersectional competence construct were the outcomes of the qualitative phase of the ICM development (Boveda & Aronson, 2019) and first piloting of the instrument.

1. The ability to clearly identify sociocultural group categories and markers of difference.
2. An understanding of the interlocking and simultaneous effects of multiple markers of difference.
3. An understanding of the systems of oppression and marginalization that occur at the intersection of multiple markers of difference.
4. The capacity to co-construct and negotiate professional roles and responsibilities when teaching students with diverse abilities with the recognition that diversity among stakeholders is an asset to collaboration.
5. The ability to assess how structural forces such as cultural, linguistic, and economic factors have impacted the placement and experiences of students with disabilities and their families.
6. An understanding that personal and professional beliefs about the value of diversity are distinct but interrelated with one other; each is susceptible to change.
7. A belief of teaching, in collaboration with students and their families, as agency for social change.
8. Evidence of high expectations for all students that includes an asset-based approach toward student diversity.

### **SAMPLE ITEM**

The development of the ICM produced two subsets of items (Boveda, 2016). Subset A included items that participants could self-report their intersectional competence. Subset B required answering questions about five narratives, each of the narratives built on the previous items. Subset B culminated to a final question that required participants to answer whether or not a student struggling with mathematics should be referred for special education services.

#### **Narrative E (Challenges with Mathematics, Evidence of a Dis/ability?)**

By the second semester, Ms. Delgado and Ms. Gardner had established a set routine for co-planning, parental communication, and providing feedback to students. Both teachers were responsible for delivering math instruction for all learners in the 4th grade mathematics class.

During her teacher preparation courses and field experience hours, Ms. Delgado learned numerous strategies for differentiating instruction and reaching students who had difficulty grasping a lesson. She would often check in on the students in Ms. Gardner's class who struggled to understand a mathematical concept. By October, both Ms. Delgado and Ms. Gardner were noticing that Abner often required extra support.

Abner showed little learning gains in math. During one of their planning sessions, Ms. Gardner asked Ms. Delgado if she thought that Abner should be recommended for evaluation for special education services.

Abner's family recently moved into the neighborhood. Ms. Delgado and Ms. Gardner each had prior experience working with Spanish speakers and were certified by the state to work with English Language Learners. They had little experience, however, working with students whose home-language is Haitian-Creole.

Ms. Gardner asked Ms. Pierre, a fourth-grade teacher who was of Haitian descent, to help translate during an after-school parent conference. The parents were not able to take off work to attend the meeting, but Abner's father had a brief phone conversation with Ms. Pierre. It was evident that his parents had a strong interest in Abner's academic success. The teachers learned that although he was the same age as his peers, before moving to the United States two years ago, Abner had less than one year of formal schooling in Haiti.

What other factor(s), besides Abner's mathematical abilities, may be impacting his understanding of the interventions provided by his teachers? Identify **at least one** and be as specific as possible.

Should Abner be evaluated for special education services? Explain why or why not. Be as specific as possible.

#### FINAL KEY POINTS TO CONSIDER

Since the initial piloting of the instrument, I have continued to develop items across the country and recognize how the specific colonial history of a region shapes how sociocultural markers are constructed. As such, intersectional competence goes beyond the hyper-focus on student differences, static and essentializing conceptions of sociocultural markers of identity, or the prioritizing of a subject matter of a course. Intersectional competence requires educators to examine their own intersecting identities, reflect on their professional socialization, and consider who are the best collaborators to determine a student's needs, starting with the student.

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