

Transitioning from Cultural Diversity to Intercultural Competence in Mathematics Instruction  
*Preliminary Research Report*

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**Abstract**

We report on our work to build an applied theory for intercultural competence development for mathematics teaching and learning in secondary and tertiary settings. Based on social anthropology and communications research, we investigate the nature of intercultural competence development for mathematics instruction among in-service secondary mathematics teachers and college faculty participating in a university-based mathematics teacher professional development program. We present results from quantitative and qualitative inquiry into the intercultural orientations of individuals and subgroups (teachers, teacher-leaders, university faculty and graduate students) and offer details on the development of case stories for use in the professional development of mathematics university teacher educators, in-service teacher leaders, and secondary school teachers.

*Keywords:* secondary teacher preparation, cultural competence, intercultural development, cultural diversity

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*I wanted to explain why some people seem to get a lot better at communicating across cultural boundaries while other people didn't improve at all, and I thought that if I were able to explain why this happened, educators could do a better job of preparing people for cross-cultural encounters.*  
(Bennett, 2004, p. 62).

## **Relation of the Work to the Research Literature**

While the significance of diversity as a factor in the education of children has been widely discussed for many years, the nature of “diversity” continues to evolve in U.S. classrooms (Aud, Fox, & KewalRamani, 2010). And, though a similar evolution in diversity is evident in school staffing among paraprofessionals, the teacher and principal populations continue to be more homogeneous than varied in terms of government-surveyed categories such as race, education, and socialization (Strizek, Pittsonberger, Riordan, Lyter, & Orlofsky, 2006). Since “culture” can include professional and classroom environments as well as personal or home experience, responding to it is a multi-faceted challenge (Greer, Nelson-Barber, Powell, & Mukhopadhyay, 2009). As Stigler and Hiebert (1999) noted after an international study of instruction, “teaching is a cultural activity...[and] recognizing the cultural nature of teaching gives us new insights into what we need to do if we wish to improve it” (p. 12). From anti-racism training to culturally responsive pedagogies, teacher education efforts have emerged largely from the same arena as teacher education itself: psychology. Yet, there is another area of the academy from which educators can draw great insight: anthropology (Ladson-Billings, 2001). That is, while psychology tackles the issue through a developmental approach to changing classroom *disposition* based on *behavior*, social anthropology provides a developmental continuum of *orientation* from a focus on *communication*. Several frameworks currently exist for professional contexts that involve understanding, interacting, and communicating with people from various cultures (e.g., from healthcare professions and international relations by governments; Bennett, 1993, 2004; Hammer, 2005, 2009; Kramsch, 1998; Leininger, 2002; Wolfel, 2008).

<p><i>Short definition of culture:</i> A dynamic social system of values, beliefs, behaviors, and norms for a specific group, organization, or other collectivity; the shared values, beliefs, behaviors, and norms are learned, internalized, and changeable by members of the society (Hammer, 2009).</p>
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## **Conceptual Framework**

Our work to build an applied theory for intercultural competence development for mathematics teaching and learning in secondary and tertiary settings is based on the *Developmental Model of Intercultural Sensitivity* (Bennett & Bennett, 2004). As a developmental model, it includes lower and upper anchor orientations, intermediate orientations, and descriptions of the transitions among the orientations. Additionally, we attend to discourse with the framing of communication dimensions for intercultural conflict resolution (Hammer, 2005). The continuum begins with a monocultural view based on the premise “Everybody is like me.” This “denial” orientation (see Figure 1) may recognize observable cultural differences (e.g., distinctions in food or dress) but not notice complex difference (e.g., in values, beliefs, or communication norms) and will avoid or express disinterest in cultural difference. The transition to the next orientation comes with the

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<sup>1</sup> This material is based upon work supported by the National Science Foundation under Grant No. DUE0832026. Any opinions, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



Figure 1a.



Figure 1b.



Figure 1c.



recognition of difference, of light and dark in a situation (e.g., Figure 1a). The “polarization” orientation is driven by the assimilative assumption “Everybody should be like me and my group” and is an orientation that views cultural differences in terms of “us” and “them.” Polarization can take the form of defense or reversal. Defense is an uncritical view toward one’s own values and practices and an overly critical view towards others’. Reversal is a negatively judgmental take on the values and practices of the group with which one identifies and an uncritical view towards others’. Transitioning to the next level of development involves attention to nuance and awareness of norms. This middle orientation is “minimization,” a lens for experience based on the notion that “Despite some differences, we really are all the same, deep down.” Minimization attends to commonality and presumed universals (e.g., biological – we all eat and sleep; and values – we all know the difference between good and evil). The minimization orientation will, however, be blind to deeper recognition and appreciation of difference (e.g., Figure 1b, literally a “colorblind” view). Transition from minimization to an “acceptance” orientation involves mindful awareness of oneself as having a culture and interacting with other cultures (plural). While an acceptance orientation is aware of difference and the importance of relative context, how to respond and what to respond to, in the moment of interaction is still elusive. The transition to “adaptation” involves developing ethnorelative frameworks for perception that are responsive to a broad spectrum of intercultural interaction (e.g., the detailed and contextualized view in Figure 1c). Adaptation is an orientation wherein one may shift perspective, without losing or violating one’s authentic self, and adjust communication and behavior in culturally appropriate ways. There are several ways that knowing one’s orientation, or the normative orientation of a group, can inform teacher and researcher work.

### Research Question & Methods

What is the nature of intercultural competence development for mathematics instruction among in-service secondary mathematics teachers and college faculty participating in a university-based mathematics teacher professional development program? Participants to date have been 26 in-service K-12 teachers and teacher leaders and 18 university faculty and graduate students. All completed the *Intercultural Development Inventory (IDI)*, a reliable and validated instrument for ascertaining a person’s intercultural orientation and eliciting intercultural development goals (50 Likert-like items and 4 open ended items; Hammer, 2009). Each report from the IDI includes responses to open ended items along with quantitative information about *developmental orientation* (the orientation most likely at work in day-do-day interactions with others), *perceived orientation* (this is often a more advanced than the developmental orientation) as well as *trailing orientation* (a fallback that may come into play in situations high in conflict or stress) and *leading orientation* (often aligned with perceived orientation, this is at the leading edge of

someone’s intercultural competence and the target for development). We are using descriptive statistics, constant comparative coding, and cross coding to examine individual orientation profile results as well as group profiles for the teachers, teacher-leaders, and university staff. Our plan is to use case methods to link participant stories of intercultural challenges in teaching mathematics to activities for increasing intentionality for intercultural development. Ultimately, the results will include stories that illuminate aspects of orientations and transitions.

## Results

In Figure 2 are the distributions among orientations for three groups. As a group, the teachers’ orientation was normatively in polarization while the teacher leaders, as a group, were largely at the lower end of minimization and the university folk were largely in minimization.

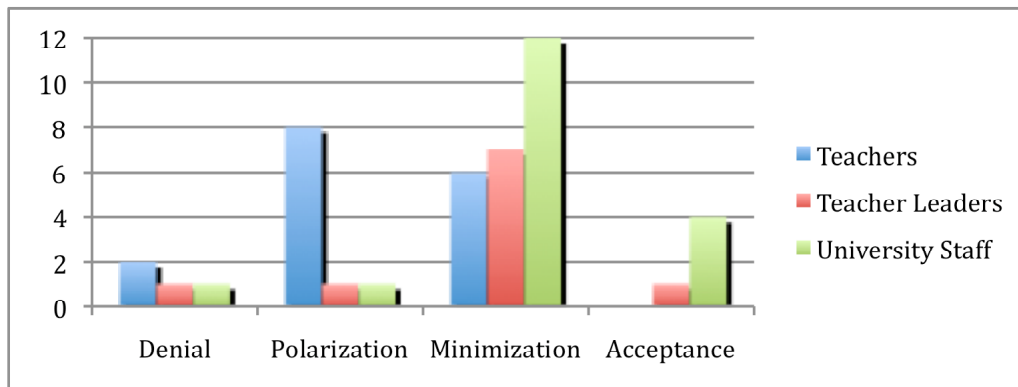


Figure 2. Distribution of Participant Developmental Orientations

Case stories are under development and will be completed and expanded for the final report and presentation. Below we offer one example. As part of the research process, we conducted group profile debriefing sessions with teachers, teacher leaders, and university staff. When debriefing, three common goals emerged from participants: (1) build *awareness of self as having a cultural lens for viewing the world*. (2) find guidance in the transitions from polarization through minimization and into acceptance, particularly how to *be mindful of one’s cultural filter(s) for interacting with the world*; and (3) engage in *building a knowledge base about equity*.

**Example Case Story.** Helen is a public high school mathematics teacher in a socio-economically and culturally diverse community. She is teaching a consumer mathematics class with mostly seniors. Helen wants all her students to believe they have what it takes to succeed in college, so she has each student create a personal career finances portfolio. Students choose a job and a place to live after college. The portfolio is a report about living and working in this potential future career: starting pay for the job in that location, education required for that job, the cost of living in that location – including a budget for housing, food, transportation, and leisure. Helen’s grading rubric has points for turning in a rough draft. Her intention is to provide opportunities for students: (1) to see themselves as college graduates, (2) to work with real-world values in creating a budget, and (3) to receive feedback on a draft so the final report will have a high score. Helen asks the class how the assignment is going and several student express frustration and confusion. She announces that she will be available after school to help in office hours and is disappointed that students do not take advantage of this opportunity. Helen gets frustrated when several students, who are not doing well, do not turn in a draft and do not come for help.

[Pause here and discuss what elements of the transition from polarization to minimization might support Helen to find a more satisfactory approach; what questions might need to be asked (and why)? What advice might Helen be ready to hear and act on?]

Helen's colleague Lee offered her own experience from high school, explaining that "going to office hours" in her middle school was a form of punishment for misbehavior or low grades. In her first year of high school, the idea of going to a teacher's office hours voluntarily made no sense to her: "Why would someone purposely take what amounted to an oral exam? Just to let the teacher know what she did not know and then be criticized for not knowing it?" Helen's first reaction was to dismiss Lee's story. "That's not what my office hours are like, that's not what I do!" Lee nodded and said, "Yes, I know. But I'm not completely sure how I learned that what it meant in high school to seek help from a teacher could be different from what it meant in middle school. I've heard students talk about different reasons for not going to get help from teachers – like having a job or working with parents or friends instead or because there was difficulty communicating with the teacher. So, I'm not sure why your current batch of students is not coming to you for help, but there are probably lots of good reasons. Good to them, I mean." Helen shook her head, "That's too bad. Students should feel comfortable going to the teacher for help. Well, I can't help them if they don't come to see me. And, they won't come see me."

Indicators that Helen has an orientation of polarization–defense include her view that she is offering "opportunities" whether or not they are seen as opportunities by students. It could be that some of what Lee suggests is true, or that students in Helen's class were uncomfortable with her seeing their development process, or something else entirely. Discuss, again, what elements of the transition from polarization to minimization might help Helen, what questions might need to be asked (and why) along with advice Helen might be ready to hear and act on in the situation.

### **Implications/Applications for Research and Practice**

A perennial challenge for any instructor is: how do I teach so that my students surpass me? What help in transitioning to global and ethnorelative mindsets can teacher educators offer if their own developmental orientations are more monocultural than intercultural? In terms of implications for research, what can researchers do to support their own growth as interculturally adaptive? For example, if researchers have a polarization orientation – where differentiating is essential – would instruments and observation protocols they designed do a good job of capturing the views and practices of teacher leaders in a minimization orientation (or vice versa)?

### **Questions for the Audience**

1. The example given here is largely independent of mathematics content. What kind of story might foreground the intersection of content and culture in secondary mathematics, for example with the framing of teacher response to a student's questions about generating a polynomial from a graph where the  $x$ -intercepts are marked and labeled versus just marked.

2. In an editorial, Ball, Goffney, and Bass (2005) have argued that in addition to teachers being culturally aware, that it is important for *students* to build adaptive competence for mathematics: In a democratic society, how disagreements are reconciled is crucial. But mathematics offers one set of experiences and norms for doing so, and other academic studies and experiences provide others. In literature, differences of interpretation need not be reconciled, in mathematics common consensus matters. In this way, mathematics contributes to young people's capacity for participation in a diverse society in which conflicts are not only an inescapable part of life, but their resolution, in disciplined ways, is a major source of growing new knowledge and practice. ... Important to our argument is that these skills and practices that are central to mathematical work are ones that can contribute to the cultivation of skills, habits, and dispositions for participation in a diverse democracy. (p. 4)

How might this perspective need to be revised or framed to be accessible to a teacher with a denial orientation? A polarization orientation? A minimization orientation?

3. How about new/pre-service teachers?

## References

- Aud, S., Fox, M., & KewalRamani, A. (2010). *Status and Trends in the Education of Racial and Ethnic Groups* (Tech. Report; NCES 2010-015). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. GPO.
- Ball, D. L., Goffney, I. M., & Bass, H. (2005). The role of mathematics instruction in building a socially just and diverse democracy. *The Mathematics Educator*, 15(1), 2-6.
- Bennett, M. J. (2004). Becoming interculturally competent. In J. Wurzel (Ed.), *Towards multiculturalism: A reader in multicultural education* (pp. 62–77). Newton, MA: IRC.
- Bennett, M. J. (1993). Towards ethnorelativism: A developmental model of intercultural sensitivity. In R. M. Paige (Ed.), *Education for the intercultural experience* (pp. 21-71) Yarmouth ME: Intercultural Press.
- Bennett, J. M. & Bennett, M. J. (2004). Developing intercultural sensitivity: An integrative approach to global and domestic diversity. In D. Landis, J. M. Bennett, & M. J. Bennett (Eds.), *Handbook of intercultural training* (pp. 147–165). Thousand Oaks, CA: Sage.
- Greer, B., Nelson-Barber, S., Powell, A., & Mukhopadhyay, S. (2009)(Eds.), *Culturally responsive mathematics education*. Mahwah, NJ: Erlbaum.
- Hammer, M. R. (2005), The Intercultural Conflict Style Inventory: A conceptual framework and measure of intercultural conflict approaches, *International Journal of Intercultural Research*, 29, 675–695.
- Hammer, M. R. (2009). Solving problems and resolving conflict using the intercultural conflict style model and inventory. In M. A. Moodian (Ed.), *Contemporary leadership and intercultural competence* (pp. 219-232). Thousand Oaks, CA: Sage.
- Kramsch, C. (1998). *Language and culture*. New York: Oxford University Press.
- Ladson-Billings, G. (2001). *Crossing over to Canaan: The journey of new teachers in diverse classrooms*. San Francisco: Jossey-Bass.
- Leininger, M. (2002). Culture care theory: A major contribution to advance transcultural nursing knowledge and practices. *Journal of Transcultural Nursing* 13(3), 189-192.
- Strizek, G.A., Pittsonberger, J.L., Riordan, K.E., Lyter, D.M., & Orlofsky, G.F. (2006). *Characteristics of Schools, Districts, Teachers, Principals, and School Libraries in the United States* (Tech. Report; NCES 2006-313 Revised). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. GPO.
- Wolfel, R. (2008). *Culture Cubed: Towards Three-Part Definition of Intercultural Competence* (Tech. Report). Center for Languages, Cultures, and Regional Studies Position Paper, U.S. Military Academy. West Point, NY.