

## Chapter 2

### Communication, Culture, and Work in Mathematics Education in Departments of Mathematical Sciences

Shandy Hauk and Allison F. Toney

**Abstract** Communication is much more than words – written, spoken, or unspoken. It is also in how a person participates in or orchestrates discussion (in a hallway or in a meeting). Conversation is shaped by what a person knows or anticipates about colleagues' previous experiences and how to attend to that in the context of the goals of a given professional interaction. This chapter builds a foundation of ideas from discourse theory and intercultural competence development as aspects of communication. The presentation is grounded in two vignettes and several small examples of discourse about work in mathematics education. The ideas and vignettes provide touchstones for noticing and understanding what happens when people communicate across professional cultures within departments of mathematics.

**Key Words** Professional cultures, Post-secondary mathematics education, Intercultural orientation, Discourse

#### 2.1 Introduction to Noticing *This* and *That*

The human capacity to reason includes a reliance on comparison, on noticing difference: *this* is, or is not, like *that*. Grouping makes for comparison of *these* and *those*, for *us* and *them*. When we compare, we discern similarity and difference. With practice, more fine-grained noticing happens. In mathematics, the noticing happens about elements (propositions) that are fairly stable. A theorem, once proved in a particular axiomatic system, pretty much stays proved.

In education, the noticing happens about elements (people) that are quite dynamic. Any lesson learned from work in mathematics education is subject to revision, debate, reframing, and change.

The chapter is about becoming aware of nuance in the observation of *this* and *that*. Yet, the path to awareness is fraught with pitfalls. A unifying feature of these pitfalls is over-reliance on the polarizing of *this* and *that* into *this* VERSUS *that*. In fact, dissimilar perspectives on what constitutes work in mathematics education – even among collaborators on a single project – can result in uncertainty that becomes confusion, turmoil, or conflict. The journey begins with a question for the reader: Would everyone in your department agree that the communication about work in mathematics education in the department is effective, appropriate, inclusive, and respectful?

#### 2.2 Noticing Difference

Successful professional communication involves interacting with the multiplicity of discourse styles that colleagues, curriculum, and department history bring to a conversation. Some faculty work in largely monocultural departments in the sense that most colleagues share experience of a common set of personal and professional norms and practices. However, in the US, departments may have a dozen different foci of

professional work. It means faculty, staff, and students are destined to have regular opportunities for cross-cultural experience that, for many, may be fraught with unavoidable uncertainty.

### 2.2.1 A Note on “Cases”

We ground our discussion of uncertainty in two vignettes, real examples of communication in departments of mathematical sciences (all names have been changed). These are gleaned from the authors’ own work in mathematics education. It is our hope to offer windows (and possibly mirrors) on the experiences of those navigating the challenges of communicating across different sub-cultures in mathematics departments.

A vignette-based case is not just a short story. A case combines a vignette that is a context-rich description of a dilemma, challenge, or epitome with an analysis of the vignette. A worthwhile case will give rise to discomfort for the reader. An effective case generates dissonance between what case users thought they knew to be true and what they experience in the vignette and analysis. Such cognitive dissonance is the basis on which new understanding is constructed.

### 2.2.2 *Top Tier Journals: Noticing across Two Professional Sub-cultures*

As academics, we have within-professional-group standards for communication about our work. Standards can be seen, for example, in the ways faculty generate and disseminate the various publications they create. Yet, norms vary across different sub-communities within a department (e.g., researchers in undergraduate mathematics education, mathematicians, statistics education researchers, statisticians, teacher educators, etc.). Getting a paper into a particular peer-reviewed journal involves different activities for the author than publishing a book, contributing to a grant proposal, or conducting and reporting on a program change. What they all share, however, is the scholarly standard of peer review. The tricky bit is who is a “peer” and who decides the standards for review? Uncertainty in this aspect of interaction across professional sub-cultures and how some might handle it are illustrated in the first vignette, *Top Tier Journals*.

#### **Top Tier Journals**

A tenure-track colleague of mine was preparing for her third-year review. Because the department chair was not familiar with her research area, he told her to put together “a list of the top tier journals in the field of math education.”

The colleague immediately sought advice from her peers. She asked questions of 20 faculty members across the US who worked in mathematics education: “What is on the top 10 list for sharing research work, the top 10 list for sharing applied and program-level work (like the report of how we redesigned our sequence of courses for pre-service elementary teachers), and the top 10 list for sharing course-level work (like particular lesson materials or advice on how to use certain approaches in teaching such as inquiry-based learning/IBL)?”

This group of 20 people agreed on a list of 30 dissemination outlets, though not necessarily on the ordering within a list. Then my colleague came to me. She described what she had done, and said, “Would you go over these lists and let me know what you think? Is there anything obvious that is left out or something you would move from one list to another?”

My first hint this was going to be an unusual conversation *should have been* noticing that she had taken the chair’s instructions and made a task of not one list, but three – one for research, one for applied program work, and one for materials development work. But no, I only noticed that in passing, thinking,

“Well the first list is what she was asked for, the other two are useless.” Then, reading the first list, I was stunned to see that the *Journal of Mathematics Teacher Education (JMTE)*, what I would consider – what *my* peers would consider – the top tier journal in our field, was absent from the list.

At first I was very angry. I thought to myself, “Oh, this is a typical demonstration of the narrowness of the fields and the ignorance of some of my colleagues and the fact that they don’t pay attent...” — then I stopped myself.

I realized, “Wait a minute: She came to me and *asked* me.” She recognized there might be something she doesn’t know. She is saying it would be worthwhile for her to understand my values. She asked me for help.

So, while she and I were both surprised she didn’t know about *JMTE*, I ended up being ashamed (quietly, to myself) when I reflected on my first response to the other two lists as “useless.” In reviewing them, I realized there was a lot of sharing going on out there through open-source resources and conferences and organizations like the Mathematical Association of America (MAA) and the American Mathematical Association of Two-Year Colleges (AMATYC) about which I was completely ignorant. I had trouble coming up with outlets I could add to the last two lists and, to mitigate my shame, I am proud to say it occurred to me to say, “Let’s go talk with Pat and Xie. I remember them talking about IBL. I don’t know much about it, but I wonder if the outlets are on the lists.”

In the end, it actually turned out to be a positive experience. In part, this was because I was careful not to go off into a rant (except in my head, perhaps). It was an opportunity for us to unpack the subtle and not-so-subtle differences between our work worlds, the way scholarship is valued and the locations in which work in mathematics education is valued.

The first part of the vignette highlights the ways different sub-communities exist within departments – specifically, within the field of research in mathematics education. For both the narrator and her colleague, what was valued depended on what respected peers saw as valuable. Also, note that the colleague was aware of and valued other forms of dissemination, beyond research products, in a way the narrator did not. In the second part of the vignette, the narrator noticed, reflected, and then acted on the difference between what she valued and what the colleague asserted as valuable.

*Top Tier Journals* highlights the fact that meaning is *situated*. Consider how to interpret each of these statements: “The coffee spilled, get a mop” and “The coffee spilled, get a broom” (Gee 1999, p. 48). In each case, context-based storylines that may or may not be consciously considered are connected to the word “coffee.” In the first statement, the cue of “mop” is likely to trigger a situated meaning for coffee as a liquid while, depending on one’s experience and available storylines, “broom” may be more likely to bring to mind dried beans (perhaps whole, or perhaps ground up). Meaning also is situated in larger conversations of current and historical social experiences and cultural practices. Situated meanings are dynamic in that they are assembled on the spot, based on past and present experience, “customized in, to, and for context, used always against a rich store of cultural knowledge (cultural models) that are themselves ‘activated’ in, for, and by contexts.” (Gee 1999, p. 63).

### **2.2.3 Department Dynamics: Noticing about Department Norms**

In each department a variety of norms exist for how we talk with each other about teaching. A department’s norms for respectful communication about other work may be quite different. Consider the uncertainty of the narrator in *Departmental Dynamics*, in noticing the habits sanctioned by her department’s norms.

### ***Departmental Dynamics***

I was so totally caught by surprise when two colleagues made snarky comments about our colleague Bea's recent work to include attention to social justice in her liberal arts math class. Partly my surprise came from the fact that earlier the same day, in a department meeting, they had spoken up in favor of her efforts to put together summer support for graduate students to be research assistants on various department projects. But a few hours later in the hallway, they were snide and disrespectful.

I had to ask myself: *Why did these people feel comfortable making offensive statements in front of me in the first place? Are they really that free-of-clue?*

Instead of doing or saying anything, I froze – not knowing what to say, what to do, how to respond.

Then I thought about my freezing up. I felt like a bystander at a robbery. I asked myself: *Have I been clear about my values?*

And I answered: *Um, no.*

Why not? What am I afraid of? What about this department and how communication happens is pumping “frozen in the headlights” juice through my veins? And then I realized I didn't know whom I could talk with about it.

Who could I turn to and have a reasonable expectation for a productive conversation about examining and possibly modifying communication in the department? We have norms for feedback on research, on teaching, and on service. But what are the department norms for constructive feedback on communication about our work within the department – or even the university? Who decides? How are the norms changed?

Unexamined customs can encourage unexamined habits. Being informed is the first step in challenging a habit. As obvious as this is, it conflicts with one common conversational practice in departments: to speculate about what others think based on conclusions drawn from a few interactions. In scholarly work, such incomplete data gathering would be considered intellectually sloppy.

How might the narrator in *Departmental Dynamics* learn about the habits on which the observed norm rests? What are the (unspoken) assumptions about how people view and discuss teaching? A first step might be to gather more information. She might have conversations with one or two colleagues at a time, as a fact-finding mission, driven by questions like: “What makes teaching worth talking about? What is good teaching? How do you know it when you see someone else do it?” The onus would be on the narrator to avoid evaluating or judging the answers she gets – the purpose is to discover how others think, not to persuade them to think like she does. How people answer can help make explicit some assumptions and provide information for shaping subsequent change-oriented discussions.

This section gave two examples of communication about the contexts in which the work of mathematics education is conducted. The next four sections address ways of being aware of nuance within such interactions.

### **2.3 Discourse (big D) and discourse (little d)**

Interactions with other people are shaped by our orientation to noticing and engaging with difference. In the present case, interactions are situated in the tensions among types of work in a mathematics department. Professional awareness includes noticing what a colleague says, and also is present in how a person participates in or orchestrates conversation and discussion (in a hallway or in a meeting). Effective, professionally aware, conversation is molded by what a person knows or anticipates about colleagues' previous experiences and how to attend to that in the context of the goals of a given

interaction. For example, knowing how to launch a discussion and negotiate the conflicts that can emerge from a department's norms about each variety of work in mathematics education can require well-developed awareness of multiple professional cultures.

Gee (1996) distinguished between "little d" discourse and "big D" Discourse. "Little d" discourse is about written and spoken language-in-use. It is what we say and what we write. In post-secondary mathematics and mathematics education, this may include connected stretches of utterances, symbolic statements, and mathematical diagrams.

In *Top Tier Journals*, discourse (little d) between the narrator and colleague, what each person said, is absent. Instead, it is summarized by the narrator. Similarly, in *Departmental Dynamics*, the discourse in the narrator's witnessing of what was said by colleagues in two different contexts is summarized. In both cases, the nature of the interaction involved more than the words spoken.

Discourse (big D) describes *situated discourse*. Written with the capital D, Discourse indicates language *and* the norms influencing its use *and* the processes for perpetuating or changing both, in context. Little d discourse is a subset of big D Discourse.

In *Top Tier Journals*, the Discourse included the ways the narrator's interaction with her junior colleague challenged her existing notions about what was valuable in reporting on work in mathematics education. The result was two-fold. First was the expansion of the narrator's awareness, noticing and acknowledging the value of types of work other than her own. Second was the willingness to seek advice from others, just as the junior colleague sought her advice. Big D Discourse appears in *Departmental Dynamics* in that the narrator reflected on her desire to contribute to the norms for professional communication in her department. Her inner dialogue examined the kinds of conversation she thought might be needed with her colleagues. The vignette highlights her awareness of herself as a part of the Discourse, rather than a non-participant observer of discourse. As a result, at the end of the vignette she formulated questions whose answers she needed to move forward. In each case, the narrator in the vignette sought ways to use language *and* ways of thinking and valuing that were associated with a group in which the narrator saw herself participating. As Gee described it:

A Discourse is a socially accepted association among ways of using language, other symbolic expressions, and 'artifacts', of thinking, feeling, believing, valuing, and acting that can be used to identify oneself as a member of a socially meaningful group or 'social network', or to signal (that one is playing) a socially meaningful 'role' (Gee 1996, p. 131)

As in any culture, a department culture has a set of values, beliefs, behaviors, and norms in use by a group that can be reshaped and handed along to others (e.g., existing and new faculty, graduate students, administrative staff can contribute to the reshaping and handing along). Not everyone in a department may describe or experience the culture in the same way. As evidenced by *Top Tier Journals*, Discourses may differ from person to person or group to group within a department. The narrator in *Departmental Dynamics* thought there was something to navigate, reflected on what needed navigating, but did not yet know how to do the navigation. The Discourse in *Departmental Dynamics* included aspects of the departmental cultural context.

## 2.4 Framework for Intercultural Awareness and Competence

The ways we are aware of and respond to Discourse is a consequence of our *intercultural orientation*. This is not a reference to our beliefs about culture or about the doing, teaching, or learning of mathematics. Rather, intercultural orientation is the perspective about *difference* each person brings to interacting with other people, in context. For faculty, it includes perceptions about the differences between their own views and values around various types of work in mathematics education, and the views of their colleagues.

To build skill at establishing and maintaining relationships in, and exercising judgment relative to, cross-cultural situation requires the development of intercultural sensitivity (Bennett 2004). The developmental continuum for intercultural sensitivity has five milestone orientations to noticing and making sense of difference: *denial*, *polarization*, *minimization*, *acceptance*, and *adaptation*.

With mindful experience a person can develop from ethno-centric ignoring or *denial* of differences, moving through an equally ethno-centric *polarization* orientation that views the world through an us-versus-them mindset. With growing awareness of commonality, a person enters the less ethno-centric orientation of *minimization* of difference, which may over-generalize sameness and commonalities. From there, development leads to an ethno-relative *acceptance* of the existence of intra- and intercultural differences. Further development aims at a highly ethno-relative *adaptation* orientation in which differences are anticipated and responses to them readily come to mind.

### 2.4.1 Denial

As noted earlier, a central part of awareness is to observe. In the context of a conversation with colleagues, the *denial* orientation might take the form: “I know the math and the math ed discourse I use, I don't really notice any other discourse.” Such an orientation is not denial in the sense of “I'm going to say it is not there” but denial as in “I can't even see it.” The view is “we're all members of the department and we all do our work” without attention to what “our work” might mean to others.

### 2.4.2 Polarization

The *polarization* orientation towards orchestrating conversation might be characterized as: “There's a RIGHT way to talk about things and there's a WRONG way to talk about things. And we're going to make sure we use the right way.” For example, depending on the experience and values of the conversant, the “right” way to talk about work in mathematics education may or may not include education discourse or the language of assessment, curriculum, program, or teacher development. Nonetheless, enacting a polarized orientation in talking about work in mathematics education would mean seeing, for instance, that a practice is happening or noticing a norm being developed.

Perhaps, when a faculty member strongly identifies with a particular sub-culture, like research in computational proof, Scholarship of Teaching and Learning (SoTL), or assessment development, that person is loyal to it. And, when focused on right ways and wrong ways of talking, a person may not attend to what is done by people in another group: “What they say they are doing in mathematics education is not worthy of my time or energy.” In transitioning from polarization to a minimization of difference, a person may come to a new, still polarized, sense of things: “What you do in math education is so different from what I do, I can't possibly understand, review, or evaluate it.”

### 2.4.3 Minimization

From a *minimization* orientation, in minimizing differences and paying attention to similarities, colleagues may also be very true to their own version of professional culture and valued ways of communicating. For someone mathematically trained, this might be characterized as, “Look how this stuff called math ed is LIKE mathematics teaching. It has a lot in common with teaching, even if the way it is said is a little different. Let's talk about how it is similar. Let's leverage the fact that we have seen this before.” From this perspective, any work in mathematics education is similar to all other work in mathematics education – whether one is reflecting on teaching a mathematics class, writing a textbook, engaging in SoTL, leading professional development workshops for in-service teachers, or is researching how students learn to validate proofs.

Consider a basic example in the representation of effective teaching. Suppose the standard in the department is that teaching is successful when numbers from a student evaluation are high. Yet some faculty members, who are also familiar with educational theories, say that teaching is effective when students demonstrate learning in some directly measurable way, such as on a common final exam. It may be characteristic of a minimization orientation to consider both representations once and then note “But these are basically the same, so we'll use the one I know, the one commonly used in the department, the student evaluations.”

### 2.4.4 Acceptance

In developing an *acceptance* orientation, it might be more characteristic to notice and accept either representation of “effective teaching” and suggest faculty use whichever makes most sense for them. A well-developed acceptance orientation might be evidenced when a faculty member alternated between using student evaluations and direct measures of student learning when talking with a colleague. Additionally, she might encourage peers to accept and understand the difference in the two ways of thinking about teaching effectiveness.

More generally, an acceptance orientation might be characterized by statements like: “I'm a mathematician, but am accepting the fact that not all of my colleagues are going to be mathematicians” or “I'm a researcher in mathematics education, but am accepting the fact that not all of my colleagues are going to be interested in that approach” and “I'm accepting the fact that there may be other ways, teacher ed, assessment, or math ed research ways, of talking about the idea of effectiveness in teaching that are valuable and may be even more valuable to my colleagues than my way of talking about it. I can accept that those various ways will come out in the conversation in the department.” But a general intention of accepting the different ways may not provide guidance about how to make decisions about which Discourse(s) are useful in a given context (e.g., solving problems in teaching pre-service teachers may not be facilitated by a research mathematics vocabulary, and vice versa).

### 2.4.5 Adaptation

A further developmental orientation is *adaptation*. Now, not only does one accept that there are these differences, adaptation-oriented people seek for themselves, and find ways to give colleagues, opportunities in noticing, articulating, and responding to those differences. This might be characterized by statements such as, “I am looking for ways to work with colleagues to pursue the opportunities that arise from variety in approach or strategy. I don't have to assert or defend many, or even one method. Effective teaching is a relative thing. My goals are for teaching and learning of rigorous math and

those goals include the standard math language and representations. How my colleagues and I connect ideas and access, organize, or value ideas is not necessarily strictly limited to the ways valued by my perspective.” In adaptation, a person can converse well with people of differing mindsets, understanding and appropriately using Discourse familiar to conversational partners.

### **2.4.6 Integration**

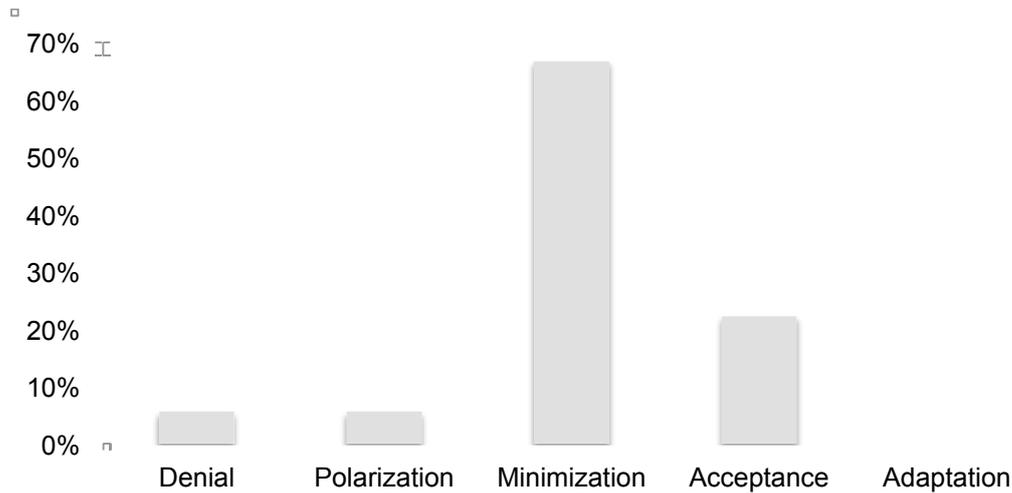
Though not yet fully tested by researchers, the theory of intercultural competence development also hypothesizes something called an *integration* orientation. This is something that is likely to be very rare. This perspective might be characterized by a statement like: “Okay, that particular approach to this problem of what effective teaching is, that is a whole other way of looking at the world. It's internally consistent, which I value. So, it's okay. And I'm going to integrate what I can while remaining true to mathematics and to my own work in mathematics education. I'm going to be myself as a professional, in that environment.” We suspect such a view might be analogous to the ultimate mission of the scholarship of theology: studying a variety of belief systems, without disagreement or approval of the system, while remaining authentic in one's own beliefs. In the research about intercultural competence development, examples of how an integration orientation might be realized come in the shape of expert and effective negotiators in high stakes endeavors (e.g., diplomat, hostage negotiator).

## **2.5 Being Intentional in Noticing Professional Differences**

In a recently concluded project, we spent time and attention on dealing with the realities of navigating the multiple cross-cultural relationships in creating and running graduate courses for secondary mathematics teacher professional development (Hauk et al. 2011; Hauk et al. 2014; Hauk et al. 2015). Project participants included university staff (26 faculty members and graduate students) in three departments of mathematical sciences whose work included research mathematics, research in mathematics education and teacher education, curriculum development for undergraduate and graduate mathematics, and professional development of in- and pre-service secondary mathematics teachers. Some of the university staff developed and taught courses for teachers and teacher leaders (71 teachers, 23 leaders) while others conducted research on the teaching and learning in those courses.

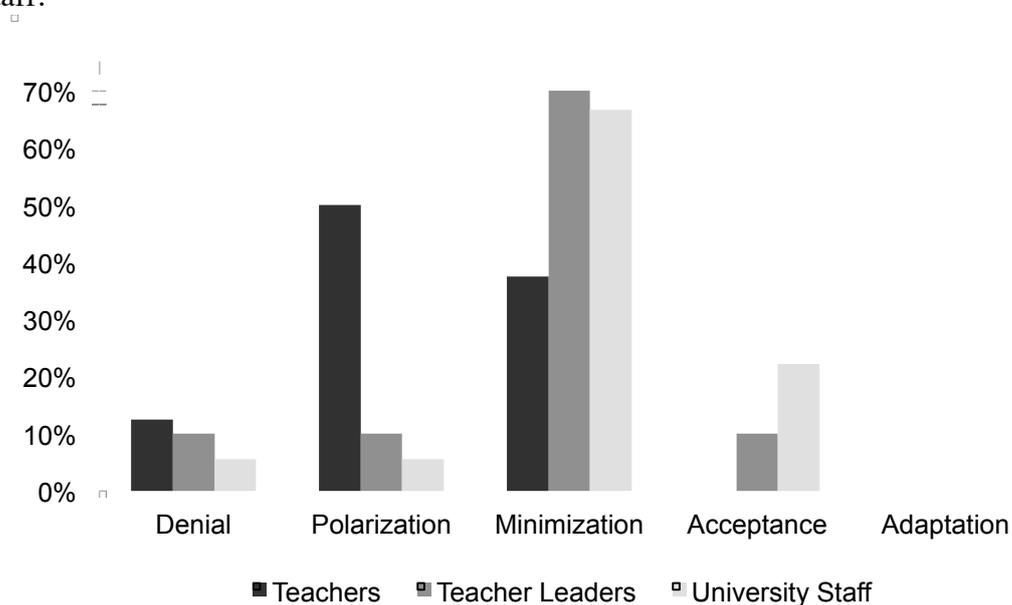
### **2.5.1 Example of Difference in Orientation across Professional Groups**

All staff, teachers, and teacher leaders completed a valid and reliable measure of intercultural sensitivity (Hammer 2009). In Figure 2.1 are the distributions of intercultural orientation for the university staff on the project (faculty members and graduate students). As a group, their orientations were largely in minimization.



**Fig. 2.1** Distribution of university faculty and graduate student intercultural orientations.

In Figure 2.2, the distribution for university staff is situated in the larger view of intercultural orientations for all of the participants in the project. Notice that the orientations of teachers were more evenly distributed between polarization and minimization while the distribution for teacher leaders was more like that of university staff.



**Fig. 2.2** Distributions of all three groups' intercultural orientations.

As part of the project, we conducted a debriefing session with each group. The session explained the framework and the five milestone orientations for intercultural sensitivity. In each case, the group saw the distribution of their orientations and that of the other two groups. Each group discussed in their session what knowing this information could contribute to knowledge about themselves and about working with the other two groups.

In particular, university faculty members and graduate students said they felt a challenge in getting teachers to see the connections, the similarities, among ideas. The large proportion of teachers with a polarization orientation meant teacher-participants

were willing and able to notice difference. University staff (who were mostly minimizers seeking common ground) often found themselves uncomfortable with this attention to difference. They were stymied about how to negotiate conversations with teachers whose Discourse was framed to highlight difference using right/wrong, strong/weak, good/bad polarization. In the debriefing session, university staff learned that noticing differences within and among things that may appear to be similar is a hallmark of acceptance. The opportunity existed to encourage more detailed exploration of difference and similarity in ways that would support intercultural development for polarizers and minimizers.

With knowledge of the intercultural developmental continuum, and their mostly minimization orientation, the group of university staff also explored the assumption that equality and equity are the same. One approach to teasing apart the two ideas is to think about the distinctions between “fairness” and equality. Consider the following example.

One university faculty member had broken a leg skiing and was using a small cart under one knee when walking. If each program faculty member was expected to give teacher-participants a 40-minute walking tour of some part of the university, then the cart-bound faculty member was unfairly burdened. An alternate way to fulfill the responsibility was needed. An unequal but fair solution: the colleague would sit with participants during their first lunch in the dining hall. Not only would this be an excellent addition to the “tour” of the campus, it would give participants a chance to talk informally with a program faculty member (an opportunity absent in the previous plan).

### **2.5.2 Connecting to the Vignettes**

Given these experiences in the recent project, for this chapter we selected material for the two case vignettes to highlight communication across the polarization-minimization-acceptance orientations. In *Top Tier Journals*, the narrator was challenged in a way that might be seen as moving her from polarization towards minimization, while the colleague generating the lists had a minimization orientation, perhaps moving towards acceptance – she was seeking to understand the large and small differences across some types of work in mathematics education. In *Departmental Dynamics*, the acceptance orientation of the narrator might be seen in that she noticed difference and wanted to learn how to negotiate the difference – these are earmarks of early adaptation.

What is more, the vignettes were designed to keep other aspects of Discourse in the background, such as gender. While a deep discussion of the role of gender in communication is beyond the scope of this chapter, communication about work in mathematics education in a department of mathematical sciences may be gender connected in several ways.

## **2.6. Gender, Discourse, and Professional Culture**

By one estimate, two-thirds of the mathematics department faculty who do professional work in mathematics education are women (Reys 2008). This has consequences for how the work is communicated, perceived, and valued. The Discourse resources of women are often different from those of men. In fact, “there are two abiding truths on which the general public and research scholars find themselves in uneasy agreement: (a) men and women speak the same language, and (b) men and women speak that language differently” (Mulac 1998, p. 127). And, we would add, (c) not all women “speak that language differently” in the same way!

### 2.6.1 Women speak differently in different ways

International and national variation means factors of ethnic, racial, and other types of group and institutional enculturation and socialization are involved in same-gender professional intergroup communication. For example, one comparison of African American and European American women found a direct communication style to be more common among African American women than the indirect framing most used by their European American peers. Both groups of women had a goal of reducing potential conflict in the workplace (or, largely in the case of the European American participants, conflict avoidance), but their methods for how to articulate and achieve it were different (Shuter and Turner 1997).

From a gender-as-culture perspective, communication habits emerge from a childhood and adolescence filled with same-sex conversational partners and a lifetime of social expectation (Maltz and Borker 1982). Review of the literature on studies of language and gender has found that women may have access to power (and more acceptance) in a majority culture context when using indirect language, uncertainty, and hedges in relatively long sentences: “Well, I was wondering if...,” “Perhaps we might...,” “It’s kind of...,” while men fulfill expectations by referencing quantity or judgments in direct statements: “An evaluation of 3.8...,” “It’s good...,” “Write it down.” (Mulac et al. 2001, p. 125).

The fact that interaction in most universities occurs in the context of historically male Discourses makes every interaction between the sexes a *doing* of gender in some way (Uchida 1992). Consequently, gendered communication structures can be (dis)empowering depending on context. For example, one “ironic consequence” for women who adopt a more direct communication style is that they “are rated as less warm and likeable, and evaluators indicate less willingness to comply with their requests” (von Hippel et al. 2011, p. 1312).

Additionally, those whose work focuses on teaching tend to value a pragmatic approach and may seek career rewards based on personal motivation rather than external distinction (Wang et al. 2015). Some have written about the importance of women seeking to participate in the career reward structures and other status quo value systems in the academy (Nicholson and de Waal-Andrews 2005; Olsen et al. 1995). However, embracing the status quo without also attempting to change it has the danger of derailing progress in the intellectual and professional work of mathematics education.

### 2.6.2. Views of Work in Mathematics Education

What does work in mathematics education in a department of mathematical sciences look like from the various intercultural perspectives, taking gender as an aspect of the Discourse? From a polarized orientation, the situation regarding work in a department may seem to be one of unending conflict, of the male-dominated status quo (them) *versus* women (us).

From a minimization view, the situation would seem mutable, if slowly, towards a goal of commonality. The more equivocal each type of language use becomes, the more that women use male language features and vice versa, the closer the department comes to an equality in talk. The problem in this over-reliance on commonality is that equality in discourse style is not equity in Discourse. As Marilyn Cochran-Smith and colleagues have recently described it, “With the former, the valence of the terms is primarily about sameness (equality) or difference (inequality), while with the latter, the valence of the terms has primarily to do with fairness and justice (equity) or unfairness and injustice (inequity)” (Cochran-Smith et al. 2016, p. 69).

From an acceptance orientation, gender-as-culture and gender-as-power are overlapping ways of seeing the world and the goal might be a hazy one of “better communication” (though it would be difficult to know what steps to take to move towards the goal). Additionally, in the acceptance view, noticing of differences in language usage would be a tool to understanding the intentions and perceptions of colleagues, with such understanding seen as contributing to “better communication.”

Building on this noticing of difference in communication, the adaptation orientation would attend to creating infrastructure that validates and leverages the subtleties of difference and uses variety in Discourses to mitigate marginalization. Here is a very small example: in preparation for every run-of-the-mill department meeting, the chair might provide faculty with the agenda a few days in advance and have each person email her back with a short written summary statement (25 to 100 words) about one agenda item, perhaps addressing “The things I am wondering about topic X” or “Where I’d like to see the department in two years regarding topic Y.” Creating the norm of considering one’s perspective and how to communicate it as preparation for a meeting becomes profoundly useful when the department faces a meeting where a highly charged or high stakes topic will be discussed. It can position the meeting as a place to air ideas and to collaborate on solving a community problem (rather than a place to air grievances).

## 2.7 Conclusion

Central to effective communication across multiple professional cultures is the strategy of information gathering. We cannot notice nuances in difference until we have enough information to see difference. Tackling the ideas of equity, diversity, and inclusion are current challenges in U.S. schools, colleges, and universities (Darling-Hammond 2015). In the latter-half of the 20<sup>th</sup> century, “equality” was the watchword – a minimization orientation concept. In the 21<sup>st</sup> century, more people are developing an acceptance orientation, in which gradations of commonality and difference are noticed. This has brought attention to fairness and equity. Further progress along the continuum foreshadows a need, in the not too distant future, to have conversational resources that allow adaptation to the diversity of Discourses we encounter daily.

In providing information about the intercultural orientation continuum in this chapter, we have offered language and perspective for examining professional interactions. Keep in mind, the continuum is *developmental*. This means a person can take intentional and mindful action to move along the continuum towards adaptive intercultural competence. What is more, such personal growth can support greater effectiveness as an agent of change in a department.

As noted at the start, humans compare, including comparison of themselves to others. In fact, this book is an effort in that direction. Readers get to see some of *this* and some of *that* without being put in the position of having to pit *this* and *that* against each other.

**Acknowledgements** This material is based upon work supported by the National Science Foundation (NSF) under Grant Nos. DUE 0832026 and DUE 1504551. Any opinions, findings and conclusions or recommendations expressed are those of the authors and do not necessarily reflect the views of the NSF.

## References

- Bennett, M. J. (2004). Becoming interculturally competent. In J. Wurzel (Ed.), *Towards multiculturalism: A reader in multicultural education* (2nd ed., pp. 62-77). Newton, MA: Intercultural Resource Corporation.
- Cochran-Smith, M., Ell, F., Grudnoff, L., Haigh, M., Hill, M., & Ludlow, L. (2016). Initial teacher education: What does it take to put equity at the center? *Teaching and Teacher Education*, *57*, 67-78. doi:10.1016/j.tate.2016.03.006
- Darling-Hammond, L. (2015). *The flat world and education: How America's commitment to equity will determine our future*. New York: Teachers College Press.
- Gee, J. P. (1996). *Social linguistics and literacies: Ideology in discourses* (2nd Ed.). London: Taylor & Francis.
- Gee, J. P. (1999). *An introduction to discourse analysis: Theory and method*. London: Routledge.
- Hammer, M. R. (2009). The intercultural development inventory. In M. A. Moodian (Ed.), *Contemporary leadership and intercultural competence: Exploring the cross-cultural dynamics within organizations* (pp. 203-217). Thousand Oaks, CA: Sage.
- Hauk, S., Toney, A. F., Jackson, B., Nair, R., & Tsay, J.-J. (2014). Developing a model of pedagogical content knowledge for secondary and post-secondary mathematics instruction. *Dialogic Pedagogy: An International Online Journal*, *2*, A16-40. [dpj.pitt.edu/ojs/index.php/dpj1/article/download/40/50](http://dpj.pitt.edu/ojs/index.php/dpj1/article/download/40/50). Accessed 22 March 2016.
- Hauk, S., Toney, A. F., Nair, R., Yestness, N. R., Troudt, M. (2015). Discourse in pedagogical content knowledge. In T. Fukakawa-Connelly (Ed.), *Proceedings of the 17th Conference on Research in Undergraduate Mathematics Education*.
- Hauk, S., Yestness, N., Novak, J. (2011). Transitioning from cultural diversity to cultural competence in mathematics instruction. In S. Brown (Ed.), *Proceedings of the 14th conference on Research in Undergraduate Mathematics Education* (Portland, OR).
- Maltz, D. J., & Borker, R. A. (1982). A cultural approach to male-female miscommunication. In J. J. Gumpertz (Ed.), *Language and social identity* (pp. 196-216). Cambridge, UK: Cambridge University Press.
- Mulac, A. (1998). The gender-linked language effect: Do language differences really make a difference? In D. J. Canary & K. Dindia (Eds.) *Sex differences and similarities in communication: Critical essays and empirical investigations of sex and gender in interaction* (pp. 127-155). Mahwah, NJ: Erlbaum.
- Mulac, A., Bradac, J. J., Gibbons, P. (2001). Empirical support for the gender-as-culture hypothesis. *Human Communication Research*, *27*(1), 121-152.
- Nicholson, N., & de Waal-Andrews, W. (2005). Playing to win: Biological imperatives, self-regulation, and trade-offs in the game of career success. *Journal of Organizational Behavior*, *26*(2), 137-154.
- Olsen, D., Maple, S. A., Stage, F. K. (1995). Women and minority faculty job satisfaction: Professional role interests, professional satisfactions, and institutional fit. *The Journal of Higher Education*, *66*(3), 267-293.
- Reys, R. E. (2008). Jobs in mathematics education in institutions of higher education in the United States. *Notices of the American Mathematical Society*, *55*(6), 676-680.
- Shuter, R., & Turner, L. H. (1997). African American and European American women in the workplace. *Management Communication Quarterly*, *11*(1), 74-96.
- Uchida, A. (1992). When "difference" is "dominance": A critique of the "anti-power-based" cultural approach to sex differences. *Language in Society*, *21*(4), 547-568.

- von Hippel, C., Wiryakusuma, C., Bowden, J., Shochet, M. (2011). Stereotype threat and female communication styles. *Personality and Social Psychology Bulletin*, doi:0146167211410439.
- Wang, H., Hall, N. C., Rahimi, S. (2015). Self-efficacy and causal attributions in teachers: Effects on burnout, job satisfaction, illness, and quitting intentions. *Teaching and Teacher Education*, 47, 120-130.