2016 NCTM RESEARCH CONFERENCE
April 11-13 • San Francisco

Paper Title:	Resources for Teachers' Equity-Oriented Learning and Identities
Author(s):	Nicole L. Louie
Session Type:	Interactive Paper Session
Presentation Date:	April 12, 2016
Presentation Location:	San Francisco, California

Resources for Teachers' Equity-Oriented Learning and Identities

Nicole L. Louie

The University of Texas at El Paso

A historically dominant "ideology of intelligence" frames ability—mathematics ability in particular—as something innate, fixed, and distributed along a bell-shaped curve, so that only a few are truly "good at math," most are mediocre, and some are irreversibly "bad" at it (Oakes, Wells, Jones, & Datnow, 1997; Parks, 2010). Challenging this ideology so that *all* students can access rich and rewarding mathematics learning experiences is central to achieving equity in mathematics education, yet teachers frequently (if unintentionally) reproduce it instead (Louie, 2015, 2016; Parks, 2010; Ruthven, 1987).

This paper examines the case of Amanda Pepper (a pseudonym), an urban high school mathematics teacher who consistently worked against dominant ideology and common practice to position *each* of her students as an intellectual contributor to the classroom community, with particular attention to students had previously been unsuccessful with school mathematics.

Popular conceptions of teachers would suggest Amanda is an exceptional, even heroic individual. But scholarship points to the importance of social and historical contexts—especially of school- and department-based communities—in shaping teachers' practice (e.g., Horn, 2005; Little, 1982; McLaughlin & Talbert, 2001). Amanda's engagement with equity-oriented practices, however, was unique amongst the teachers at her school. My analysis therefore looked beyond the school to identify the resources that Amanda found in her network more broadly, asking:

1. What kinds of resources support teachers' engagement with equity-oriented teaching practice?
2. How do different kinds of resources come together to support teachers' engagement with equity-oriented teaching practice?

Theoretical Framework

In his discussion of communities of practice, Wenger (1998) portrays learning as a negotiation of meaning that occurs through interactions between practitioners. In the continuous process of working out their practice, participants shift not only what they *do* but also how they *understand* their activity and themselves. Learning to teach thus entails becoming a particular kind of teacher, in a particular community of other professionals. Put more generally, learning and identity take shape in mutually informing ways, through collective engagement in practice.

A significant limitation of research on communities of practice, however, is its focus on the relatively strong relationships that arise through shared engagement in a joint enterprise. I draw on theories of social networks, in particular Granovetter's (1973) perspective on "the strength of weak ties," to address this limitation and explore the resources that "weak ties" may provide for teacher learning and identity development.

Methods

Sites and participants

Teachers at two diverse urban high schools, Union and Boxer (pseudonyms), participated in this study. The mathematics department at each school was committed to supporting all students, and every teacher participated in an equity-oriented professional development program (PD) offered by the school district that was grounded in Complex Instruction (CI; see Cohen & Lotan, 2014; Nasir, Cabana, Shreve, Woodbury, & Louie, 2014). The goal of CI is to redefine

what counts as mathematically "smart" in order to make visible and build upon the diverse intellectual strengths that every student has. That is, it directly challenges dominant, hierarchical ideas about mathematical ability.

In addition to engaging teachers with equity-oriented, CI-aligned ideas and strategies, the PD emphasized the development of robust, department-based professional communities. Teachers at Union and Boxer had dedicated time each week to collaborate around mathematics instruction. In addition, they participated in periodic CI trainings and coaching sessions.

I recruited six focal teachers (including Amanda), selecting for range along two dimensions: years of experience teaching, and leadership roles in the district CI community. These factors appeared to be connected to the depth of teachers' engagement with CI in my early observations.

Data collection procedures

I observed routine meetings of teachers' department and course teams and Complex Instruction professional development sessions throughout the 2012-2013 academic year. I also conducted 4-8 classroom observations for each focal teacher. Audio recordings, field notes, and photographs of various artifacts were produced for each observation. Informal and formal interviews were also conducted and audio recorded when possible. I transcribed all audio recordings.

Analysis techniques

I used open coding procedures (Emerson, Fretz, & Shaw, 1995) to identify categories of support that the six focal teachers described as important to them in interviews. Emergent themes were coordinated with the literature on resources for learning, identity, and meaning-making, in particular Wenger's (1998) and Nasir and Cooks' (2009) frameworks. This process produced a

list of four relatively abstract resources, which was subsequently used to code interviews as well as field notes and transcripts from my observations.

Each teacher's engagement with the work of redefining mathematical ability was characterized as ongoing (2 teachers), peripheral (3 teachers), or disengaged (1 teacher), based on differences in classroom practice and participation in CI networks. Patterns of engagement were then linked to network resources to reveal the interplay between different kinds of resources in support of teachers' learning and identity development.

This paper focuses on Amanda Pepper, but data from all six focal teachers were used to generate findings.

Findings

Comparison of teachers' professional support networks showed that their patterns of engagement were related to the distribution of four types of resources in their networks (cf. Nasir & Cooks, 2009):

- *orienting resources,* which support teachers to envision the kind of practice they want to achieve;
- *technical resources,* which support teachers with the "nuts and bolts" of enactment;
- *relational resources,* which support teachers' sense of belonging and identification with their practice; and
- *positional resources,* which support teachers' sense of worth and competence as professionals.

These resources all support both learning and identity, but in more and less direct ways. Orienting and technical resources work in mutually reinforcing and interdependent ways to directly support teachers to learn and develop their practice by providing ideas (orienting

resources) and tools for enacting those ideas (technical resources). Relational and positional resources support teachers' learning by fostering identities that motivate and encourage learning. Learning—especially learning that goes against the grain of dominant ideology and practice—is hard work. Most of the teachers in this study experienced obstacles and doubts about whether they should continue to pursue CI-inspired learning over the course of the year. Teachers' resources for understanding themselves as part of something bigger than themselves and as capable of continued learning, growth, and success supported them to persist through challenges, advocate for additional resources, and find support in their professional networks.

Amanda Pepper had a dense support network that provided resources of all four types, as did the one other teacher in the study who sustained ongoing engagement with CI-oriented reforms during the period of the study (namely, Ryan Sower; see Figure 1 for a graphic depiction of his and Amanda's networks, in contrast to William, who was peripherally engaged with CI, and Luke, who disengaged). I draw on Amanda's example here to exemplify the four types of resources and to illustrate how different resources may interact. For a more detailed analysis and discussion of Amanda's case as well as Ryan's, William's, and Luke's, see Louie (in press).

Orienting resources. Amanda described her own education as teacher-centered and procedural: she received good grades, but she realized at some point that she didn't understand how or why the mathematical formulas she knew made sense. As a Teach for America corps member, she attempted to support her students to earn good grades and high test scores, but at the end of her first year, she felt like a failure. The next summer, she had two experiences that "changed everything I do": a week-long training in CI, and another in a standards-based reform curriculum called College Preparatory Mathematics (CPM; Sallee, Kysh, Kasimatis, & Hoey, 2000). The trainers "practiced what they preached," and the experience of being a student in

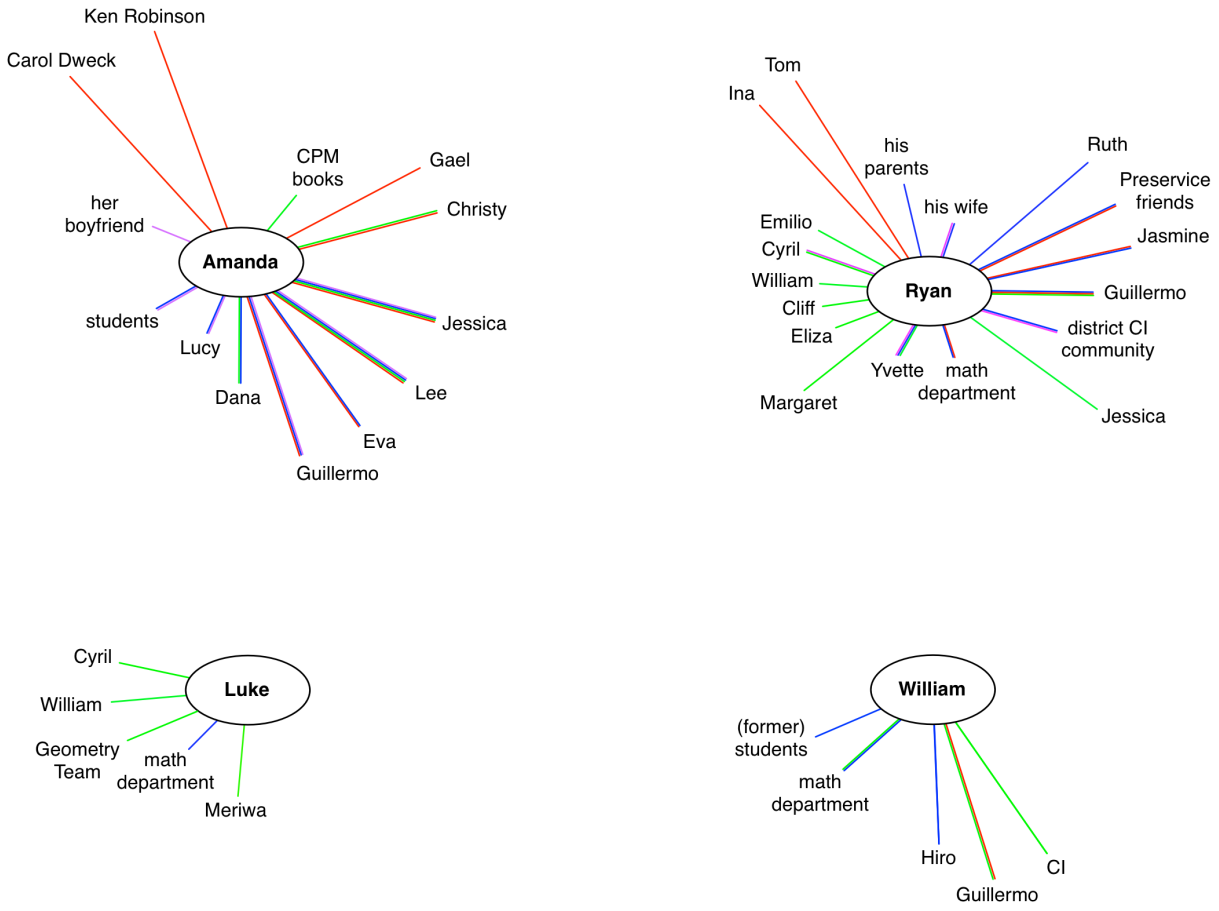

Figure 1. Four teachers' support networks and the resources they provided. Shorter lines indicate more frequent interaction. Red lines indicate the flow of orienting resources, green technical, blue relational, and magenta positional.

those environments shaped Amanda's vision for her own practice in ways that she still talked about two years later. She also drew inspiration for what teaching and learning should be from Carol Dweck, whose book *Mindset* (2006) she had read, and from Ken Robinson, who gave TEd talks that Amanda had seen. Thus, at the time of the study, the images of ideal practice that were most salient to Amanda came from distant connections and "weak" ties.

Technical resources. CI and CPM training also provided Amanda with tools and strategies for enacting the practice that she envisioned. In terms of curriculum, she described her "trust" in CPM, which allowed her to shift her focus away from writing assignments and toward other aspects of her work. In terms of instructional strategies, CI was a major resource. Amanda and Dana, a teacher at another school whom Amanda first met at CPM and CI training, spent many Saturdays together planning lessons and sharing ideas. Amanda adopted many of Dana's strategies, such as her systems for organizing student work. Additionally, a district CI coach named Lee visited Amanda's classroom, not just observing and giving Amanda feedback but also to getting to know Amanda's students and modeling particular ways of interacting with them. For example, during one visit, Lee watched a student who was often disengaged and told her that she was a "table master" because she was making very effective use of a table of values. In Amanda's view, this move had a powerful effect on the student's future participation, and in subsequent weeks, she tried to replicate it, calling different students "graph masters" and "equation masters" as well as "table masters," depending on what she saw them do. In their coaching conversations, Lee also talked through "nuts and bolts" with Amanda, such as how to use a particular manipulative or how to structure a particular worksheet so that students would have more opportunities to make their own sense of important mathematical ideas. Lee only came to Amanda's classroom twice in the year of the study—but she nonetheless supported Amanda to develop an equity-oriented practice by supporting her to learn to use particular tools for its enactment.

Relational resources. Amanda's colleagues at Boxer had all gone through CI training, and they all worked hard to support their students. However, Amanda felt that they were invested in inequitable understandings of mathematics learning and "smartness." She said, "I'm

constantly up against this traditional view of what smart looks like. … I question what I'm doing every day." In this context, relational resources were especially important to Amanda. She put significant effort into cultivating a community outside of her school not only to bolster her technical skills but also to counter her feelings of isolation. Her meetings with Dana and Lee and her attendance at district-wide CI events supported her identification with a community of like-minded practitioners, and with her practice itself.

Positional resources. In addition to providing orienting, technical, and relational resources, Amanda's community positioned her as a competent and valuable professional. For example, her classroom was featured in the district's CI Video Club, where teachers followed a protocol that directed them to notice the amazing work that Amanda's students were doing. "I have been told I'm good at [CI], in different ways," Amanda said, and this motivated her to "continue to do it," sustaining her through the challenges and setbacks she encountered. Confronted with many of the same challenges, other teachers in the study did not maintain close engagement with CI. As I detail elsewhere (Louie, in press, 2015), these teachers had fewer relational and especially positional resources than did Amanda, though their technical resources were similar.

Discussion and Implications

In focusing on resources, I illuminate how teachers' networks may support their engagement with CI (and potentially, with other reforms that involve shifts away from dominant practice). This approach demystifies the teachers' successes (and struggles), so that the field can learn from their examples. In particular, the importance of relational and positional resources has significant practical implications. Resources for learning the technical aspects of reform and even for belief change—areas that are currently the focus of teacher education and professional

development—do not appear sufficient for fostering sustained engagement with reforms. Resources that support teachers to develop a sense of themselves as competent members of reform-oriented communities should also be considered by designers of teacher learning experiences and by teachers themselves, as they organize their own networks and learning opportunities.

References

Cohen, E. G., & Lotan, R. A. (2014). *Designing groupwork: Strategies for the heterogeneous classroom* (Third edition). New York: Teachers College Press.

Dweck, C. (2006). *Mindset: The new psychology of success*. New York: Random House.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). *Writing ethnographic fieldnotes*. Chicago: University of Chicago Press.

Horn, I. S. (2005). Learning on the job: A situated account of teacher learning in high school mathematics departments. *Cognition and Instruction*, *23*(2), 207–236.

Little, J. W. (1982). Norms of collegiality and experimentation: Workplace conditions of school success. *American Educational Research Journal*, *19*(3), 325–340.

Louie, N. (in press). Supporting teachers' equity-oriented learning and identities: A resource-centered perspective. *Teachers College Record*, *119*(5).

Louie, N. (2015). *Learning to redefine "good at math": Tensions and possibilities in equity-oriented mathematics teachers' everyday practice* (Doctoral dissertation). University of California, Berkeley.

Louie, N. (2016). Tensions in Equity- and Reform-Oriented Learning in Teachers' Collaborative Conversations. *Teaching and Teacher Education*, *53*(1), 10–19.

McLaughlin, M., & Talbert, J. (2001). *Professional communities and the work of high school teaching*. Chicago: University of Chicago Press.

Nasir, N. S., Cabana, C., Shreve, B., Woodbury, E., & Louie, N. (Eds.). (2014). *Mathematics for equity: A framework for successful practice*. New York: Teachers College Press.

Nasir, N. S., & Cooks, J. (2009). Becoming a hurdler: How learning settings afford identities. *Anthropology and Education Quarterly*, *40*(1), 41–61.

Oakes, J., Wells, A. S., Jones, M., & Datnow, A. (1997). Detracking: The social construction of ability, cultural politics, and resistance to reform. *Teachers College Record*, *98*, 482–510.

Parks, A. N. (2010). Metaphors of hierarchy in mathematics education discourse: The narrow path. *Journal of Curriculum Studies*, *42*, 79–97.

Ruthven, K. (1987). Ability stereotyping in mathematics. *Educational Studies in Mathematics*, *18*, 243–253.

Sallee, T., Kysh, J., Kasimatis, E., & Hoey, B. (2000). *College preparatory mathematics*. Sacramento, CA: CPM Educational Program.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge, UK: Cambridge University Press.