

Experiencing Tensions of Nepantla While Working Toward Critical Transformations From Within

Jess Ellis Hagman
Colorado State Univ.

Matthew Voigt
Clemson Univ.

Margaret Ann Bolick
Clemson Univ.

Leilani Pai
Denison Univ.

Nancy Kress
Univ. of Colo., Boulder

Amy Been Bennett
Univ. of Nebraska

Rachel Tremaine
Colorado State Univ.

Patricia Wonch Hill
Univ. of Nebraska

Kelsey Quaisley
Oregon State Univ.

Rachel Funk
Univ. of Nebraska

Wendy M. Smith
Univ. of Nebraska

The ACT UP Math project is studying the role and impact of research-practice partnerships between mathematics education experts and mathematics department faculty to critically and systematically initiate transformative efforts to improve the experiences of students with marginalized identities in introductory mathematics programs. This paper explores the shared experiences we encountered while working toward critical transformations of three departments from within those departments, focusing on three tensions that surfaced and framing these tensions as expected and necessary components of the process of critical change. These three tensions explore the role of identity as neutral or central, the enactment of power as power over or power with, and the role of students as experts or novices. These expected and necessary tensions are evidence of the transformations from dominance toward criticality happening within the departments.

Keywords: critical transformation, equity, department change, research practice partnership

Motivation and Overview

Barriers to equitable learning outcomes and inclusive learning experiences in mathematics education have been widely researched and include issues of implicit bias (Greenwald & Banaji, 1995), microaggressions (Leyva et al., 2021), instructors' minimization of existence and impact of microaggressions (McNeill et al., 2022), negative instructor relationships (Battey et al., 2018; Hill et al., 2010), stereotype threat (Steele et al., 2002), and sense of isolation (Good et al., 2012). Math stakeholders are aware of the need to attend to equity within their math programs, but they are often not familiar with how to accomplish this, and they feel disengaged from these conversations due to a lack of training (Apkarian, et al., 2021). Stakeholders need support to develop critical understandings of the factors contributing to differences in outcomes and experiences for marginalized students and to translate their understanding into action. To accomplish this, the ACT UP Math project is studying the role and impact of research-practice partnerships between critical mathematics education researchers and mathematics department faculty to critically and systematically initiate transformative efforts to improve the experiences of students who are members of marginalized identity groups in introductory mathematics programs.

In Fall 2022, the leaders from the three mathematics departments in collaboration with critical mathematics education researchers began the formation of a Networked Improvement Community (NIC) to initiate improvement cycles to critically transform their introductory

mathematics programs. Each of the mathematics departments formed local NICs composed of various stakeholders (instructors, administrators, and students). The local NICs collected quantitative and qualitative data to observe the equity issues needing to be addressed; then they met to reflect and discuss what they saw in the data and developed a plan for programmatic changes to implement in Fall 2023-Spring 2024. Throughout this process, the mathematics education researchers worked with the local NICs to support their understanding of critical transformations and develop action plans and collected data to better understand the experiences of the NICs. This paper explores the shared experiences we encountered while fostering critical transformations, focusing on the tensions that have surfaced and framing these tensions as expected and necessary components of the process of critical change.

We are guided by the following research question: *What tensions are experienced by research-practice partnerships, as mathematics department stakeholders work together to critically transform their introductory mathematics programs?*

Framing Critical Transformations and Tensions

Critical transformations require that we critique and challenge the existing structures that shape students' mathematical experiences, and we seek to make improvements that extend beyond the confines of these systems. These systems include the mathematical content we teach, the way we teach it, the support programs for students, the departments that house these programs, the advising processes placing students into these courses, and much more. As we work in partnership to change introductory mathematics programs from within these programs, we draw on Gutiérrez's (2002) distinction between the dominant and critical axes of equity within mathematics education. The dominant axis attends to achievement and access, and is the primary - and sometimes only - component of equity that gets attention when undergraduate mathematics stakeholders discuss the importance of diversity, equity, and inclusion (DEI) (Tremaine et al., 2022). Focusing equity efforts on the dominant axis positions these changes within the existing system. While programs seeking to improve access and achievement can be important in supporting students from marginalized identities to succeed (Palid et al., 2023), such programs do nothing to change the system that these students are entering and can actually function to maintain systems of oppression rather than reform them (Martin, 2019). To discuss equity fully, we must also attend to the critical axis, which encompasses issues related to identity and power. Attention to the critical axis emphasizes not only valuing the representation and success of a diverse population within a current system, but also valuing the changes that population may require or make to the system. Therefore, attending to the critical axis necessitates working toward changes to the existing system.

Gutiérrez draws on the indigenous Nahuatl word *nepantla* to emphasize the tensions that exist within the intersection of the dominant and critical axes. *Nepantla* describes the in-between, liminal space between worlds. Anzaldúa (2002) emphasizes that "transformations occur in this in-between space, an unstable, unpredictable, precarious, always-in-transition space lacking clear boundaries," and that *nepantla* is associated with "being in a constant state of displacement - an uncomfortable, even alarming feeling" (Anzaldúa, 2002, p. 243). Gutiérrez (2015) emphasizes the power of these tensions; within this transformative and liminal space of *nepantla* we will experience tensions, but these tensions are necessary to transform mathematics education.

In this study, we explore the tensions observed as the NIC members work within the systems of introductory college mathematics programs to change these very programs. We specifically view the NIC members as walking with one foot in each of the worlds of the dominant and critical discourses in undergraduate mathematics. By operating from within the existing systems,

one must have experienced some degree of success within that system: all of the NIC members are working to complete a mathematics degree or already hold graduate degrees in mathematics or mathematics education and are employed within or work frequently with mathematics departments. Recognizing the success the NIC members have experienced in these systems does not ignore the systemic barriers and struggles the NIC members themselves experience, but it does place them in a precarious position to see these systems and critique them. This analysis identifies shared tensions expressed among the three NICs and tensions that the research team observed and expressed. Drawing on the framing of nepantla, we emphasize that these expressions of tensions are evidence of the transformations occurring within these departments as they move within one world (dominant discourses) to create another (critical discourses), and we hold these expressions of tensions up as positive enactments of working to change the systems from within. We deeply respect and value the NIC members for engaging in this work and expressing their tensions and vulnerability.

Methods

Networked Improvement Communities

A consensus is emerging that “the department” is a prime locus for change (e.g., Austin, 2011; Larnell, 2023; Lee et al., 2007; Reinholz & Apkarian, 2018; Smith et al., 2021; Voigt et al., 2023). ACT UP Math seeks to support critical changes through Networked Improvement Communities (NICs; Penuel, 2020). In a NIC, a group of stakeholders convenes around a common aim, conducts a problem analysis, engages in continuous improvement cycles, and shares information across the network to contribute to collective progress. Each of the three local ACT UP Math NICs are positioned as *change agents* working to instigate critical transformations within their departments. The broader ACT UP Math NIC is made up of the members of the local NICs and the research team.

Alpha University is a public master’s degree-granting university with moderate research activity. Alpha University is both a Hispanic-Serving Institution and an Asian American Native American Pacific Islander Serving Institution. Introductory math courses are taught primarily by faculty members in small classes using active learning strategies. The NIC is composed of two faculty leaders, two faculty members, one lecturer, one graduate student instructor, and two undergraduate transfer students. The NIC met every two weeks for two hours during Spring 2023. After a first iteration of their data exploration, the NIC developed plans to disrupt the placement system for lower division mathematics courses through self-placement and is driven by a goal to create positive relationships between students and mathematics.

Kappa University is a private, not-for-profit, highly selective doctoral degree-granting university that is research-intensive. Introductory math courses at Kappa had previously been taught primarily by graduate students in small, coordinated courses with a group-work focused recitation once a week, but very recently have shifted to having all calculus I and II courses taught by a teaching faculty member in large classes with weekly recitations taught by graduate students. The Kappa NIC includes eight members, six of whom regularly attended meetings. Of these, four are administrators outside of the mathematics department and four are mathematics instructors and/or coordinators, including the two co-leaders. The Kappa NIC meets monthly via Zoom. Many NIC members had personal relationships with the co-leaders and joined because of those relationships and their trust in the co-leaders. Although it was not an explicit intention of the NIC leaders to only recruit women, all regularly attending NIC members identify as women.

Tau University is a public, doctoral degree-granting, comprehensive university with a *high research activity* Carnegie classification and two campus locations. Most math courses are taught by faculty in small classes with some instructors using active learning strategies. The Tau NIC includes 11 members and is led by three faculty members. Nine members are instructors in the mathematics department and two members are administrators at the college level. The NIC meets monthly via Zoom, partly due to their institution being spread across two campuses, and the leaders meet monthly to plan each NIC meeting. One of the leaders recruited the other two co-leaders, and together they encouraged other faculty members to join with a mass email describing the project. After a first iteration of their data exploration, the NIC has decided to focus on improving individual instructor pedagogy given the varied nature of the data they observed and cultural values about instructional autonomy.

The **Research Team** is composed of eleven people from five different, research-intensive universities. Our varied identities and experiences shape how we enter this work, the power dynamics at play within our team and how we relate to the local NIC members, our individual motivations for engaging in this research, and how we interpret our work. We practice reflexive journaling as researchers and often engage in discussions about how our own identities may be leading to biases and blindspots in our approach to this work. The **ACT UP Math NIC** is made up of the research team and the members of the local NICs, and we meet once a month. As a research practice partnership, the research team is considered part of the broader NIC, and as such we view the tensions the research team experiences as part of the data for this study.

Data and Analysis: Critical Ethnography

Our analysis draws on approaches from critical ethnography, an ethnographic research method that seeks to explicitly critique and transform systems of oppression and inequitable power relations (Palmer & Caldas, 2015). This study takes a participatory research approach using research-practice partnerships such that the researchers and the local NIC participants are in ongoing dialogue and engagement, operating together as a research-practice NIC to make changes to departments and cultures (Bryk et al., 2015; Coburn et al., 2021; Martin et al., 2020).

The data from this analysis comes from structured field notes of NIC meetings, semi-structured interviews, and reflexive journals completed by NIC members during Spring 2023. The structured field notes were completed by a researcher who attended each of the NIC meetings and documented our observations, reflections, successes, challenges, noteworthy language, and observed power dynamics. The semi-structured interviews asked NIC members about their experiences over the last semester, how they became a part of the NIC, how data were explored, and the role of equitable decision making. The interviews were conducted via Zoom and were audio recorded and transcribed. NIC members engaged in reflexive journaling throughout the semester, completing 2-5 journal entries, which allow emancipatory dialogue with the data and can help mitigate power relations between participants (Malacrida, 2007).

The research team conducted an analysis of each NIC's experiences over the past year, seeking to identify stories that were emerging from the data. This included reading all reflexive journal entries, field notes from the NIC meetings, and interview transcripts and notes from the end of the semester. We then identified storylines focused on tensions that were either directly expressed by the NIC members or leaders (including the local NICs and the broader ACT UP Math NIC) or observed by the research team. In the results, we identify these tensions as specific instantiations of moving between the two worlds of dominant and critical discourses within undergraduate mathematics.

Results

Through our experiences, observations, and analyses, we recognized ways these tensions were experienced by all local NICs and the broader NIC. In telling the story of these tensions, we chose to center the ways each tension was experienced by one of the three local NICs.

Role of Identity: Neutral and Central

The NICs are positioned in nepantla between two worlds: the critical world of centering students with marginalized identities in their change efforts and the dominant world of not naming the specific populations and instead seeking improvement changes for all students. As we set out to support mathematics departments to critically transform their introductory mathematics programs from within, we purposefully chose to not specify any populations of students that we wanted the NICs to center in their action plans. Specifically, we did not encourage the NICs to explicitly attend to race, gender, sexuality, or other social identities. We recognize that this choice may perpetuate color evasiveness and other identity neutral stances which can serve to reinforce power structures (Goldin & Khasnabis, 2022).

Our choice to not prescribe a student population for each site came from wanting to support the equity needs specific to each institution through exploring disaggregated data from their institution in comparison to a national data set. We created data dashboards (Bolick & Voigt, 2023) drawing from extant data from 21 institutions (including each of the local NIC institutions) about students' experiences in introductory college mathematics. These dashboards, and the data exploration reflection activities created for them, encouraged the NIC members to explore the data by filtering various identity markers, including race and ethnicity, gender, first generation status, sexuality, and institutional comparisons. Some of the research team assumed the NICs would use these data explorations to identify populations of students who expressed exclusionary experiences and to use this to inform their action plans in their unique context, while others did not expect the NICs to center an identity group. The research team reflected on how we did not communicate these assumptions or expectations to the local NICs, because some of the research team believed their engagement with data dashboards would naturally lead to identifying populations of students at their institution who were especially in need of critical transformations to their introductory mathematics program.

Though the NICs did attend to student identity in their data explorations, they did not attend to a specific identity in their action plans. The Tau NIC's goal was to motivate all students to engage/succeed in mathematics, with little attention brought to any specific population. The Alpha NIC have been exclusively attending to lower division courses and the students who take those courses. The Kappa NIC members expressed interest in focusing on students who persist in the calculus sequence and those who do not and are interested in students who did not have access to calculus. Both of these populations can be proxies for other populations, given that research shows women are more likely to not persist in the calculus sequence (Ellis et al., 2016) and that low-income students have less access to advanced mathematics courses (Battey, 2011; Solorzano & Ornelas, 2002), but the Kappa NIC did not explicitly name any student population.

Role of Power: Power Over and Power With

The NICs are positioned in nepantla between two worlds: the critical world of collectively leading from within their departments to make changes to them, and the dominant world of hierarchies and privileged groups exerting power over others. While striving to increase equity within mathematics departments, we see a tension between discomfort with an image of power that we are most experienced with—*power over*—while working collectively toward changing

systems built on this version of power. To work within this space of tension, we turn toward a different understanding of power. Allen (1998) defines *power with* as “the ability of a collectivity to act together for the attainment of a common or shared end or series of ends” (p. 35), contrasted with *power over*, defined as “the ability of an actor or set of actors to constrain the choices available to another actor or set of actors in a non-trivial way” (p. 33). The tension we see related to power describes the difference between enacting leadership through power over others via hierarchies and top-down decision making versus enacting leadership through power with others, which emphasizes democratic decision making and a rejection of hierarchies.

Tensions related to power dynamics were present among all three local NICs and among the researchers and the broader NIC. The Kappa leaders expressed not wanting to center their own “random ideas” about how to improve the department, discounting their own informed perspectives. The Alpha NIC leaders similarly expressed hesitancy toward enacting power over their NIC members and were “reluctant leaders,” as noted in a researcher’s summary of their NIC dynamics. Power dynamics were especially apparent within the Tau NIC. The researchers who observed the monthly Tau NIC meeting documented in the fieldnotes a sense of “power avoidance” or hesitancy to make decisions among the three co-leaders of the Tau NIC (Olivia, Natalie, and Garrett) throughout the spring semester. These co-leaders also reflected on the power dynamics at play in their leadership, noting individual experiences of these tensions. Olivia is a math education researcher and administrator at the college level at Tau with primary responsibilities to lead instructor professional development; this formal leadership role may have led to implicit assumptions she would lead the Tau NIC. She opted for distributed leadership by selecting Garrett and Natalie as co-leaders of the NIC, purposefully choosing instructors within the introductory mathematics courses to support more buy-in to any initiatives proposed by the NIC. Olivia reflected on the challenge of simultaneously valuing their voices and recognizing that they have not “gone through some sort of training ahead of time,” so she supports them and tries “to push them out of those areas where they’re comfortable to get them to do things that they might not otherwise do if they weren’t pushed.” After co-leading the Tau NIC for the semester, Natalie and Garrett expressed confusion and feelings of imposter syndrome in leading a group to enact changes while learning more about equity in higher education themselves. By putting the onus to enact equity-centered changes on mathematics department members, rather than equity experts from outside the mathematics department, such discomforts and feelings of inadequacy are to be expected and supported.

Role of Students: As Novices and as Experts

The NICs are positioned in nepantla between two worlds: the critical world of viewing students as experts of their own experiences and the dominant world of believing students are novices. In their work toward adopting more critical views of teaching mathematics, all three NICs recognized the importance of students’ voices in telling their own stories but met tension when implementing policies that reflect this belief due to dominant structures. This tension arose for the Alpha NIC while navigating the inclusion of students within their NIC, for the Kappa NIC while coming to the realization that they wish to not only gather student feedback as data but also to incorporate students into the structure of their NIC, and the Tau NIC while transitioning from thinking of student voices as aggregated and biased opinions on course evaluations to meaningful perspectives that can be actively sought as qualitative data.

Here we highlight how the inclusion of students in the Alpha NIC surfaced tensions. NIC members were cognizant of the power imbalances arising within the NIC, and the research team noted this dynamic at the onset of the NIC formation. One faculty NIC member, Caroline, called

out the power dynamics within the NIC, acknowledging in an interview that there is a “power dynamic between faculty (of different ranks/positions) and students in the NIC.” The NIC faculty attributed these power imbalances due to “natural” hierarchies (student/instructor), logistical aspects (who leads the meeting), or the result of student characteristics (shyness).

NIC leaders attempted to mitigate this power differential by creating inclusive spaces for students to hold equal weight in the conversations through intentional pairings of instructors and students, small group discussions and share-outs, and a democratic voting system to decide next steps. While the democratic process of voting within the NIC introduced a measure of equality in decision-making, it did not counter the authority of faculty perspectives in decisions since faculty members outnumbered the students in the NIC. Students did not explicitly name a power dynamic occurring across students and faculty, but shared experiencing discomfort while in NIC meetings. One student NIC member shared that although they are not shy, settings “like [the NIC] make me a little bit nervous,” and “it is a bit intimidating having professors in the group, especially since three are current professors of mine.” Students identifying their own discomfort without recognizing the power imbalance placed the blame on themselves. The Alpha NIC was simultaneously grappling with the role of student perspectives to inform action plans. The Alpha NIC created two action plans focused on suggestions disclosed during a student focus group: restructuring the placement system for first year mathematics courses for students to self-place and engaging in interdisciplinary mathematics seminars. By valuing the voices of students in the focus group, the NIC saw students as experts on their own experience. Juxtaposing the students in the focus group with the status of student NIC members illustrates the tension well. The students outside of the NIC are positioned as experts, yet the students within the NIC are positioned as novices.

Conclusion, Implications, and Next Steps

Our research team felt empowered in naming the tensions around the roles of identity, power, and students and sharing them with our local NIC partners. By framing these tensions through the lens of *nepantla*, we feel more validated in our experiences and empowered to live with them instead of trying to rush away from them. When we shared these tensions with our local NIC partners, they expressed also valuing the tensions being named and shared, that these tensions “resonate,” and that they “appreciate the space to think about the tensions.” When responding to each specific tension anonymously on a Jamboard, most participants reflected on how they experienced these tensions, however one commenter shared that they did not resonate with the power tensions: “Perhaps I’m oblivious, but I haven’t noticed power-over tensions, despite the fact that we have college-level and department leadership working alongside junior faculty.”

These tensions also bring to the forefront the benefits and challenges of working within a research-practice partnership (such as through NICs) and how to do so equitably (Denner et al., 2019). Ryoo et al.’s (2015) definition of equitable research-practice partnerships includes “challeng[ing] power dynamics and hierarchies; regularly clarify[ing] and surfac[ing] needs, wants, and expectations relating to the partnership and partners’ professional contexts; and attend[ing] to the changing needs of the collaboration” (p. 1). We position tensions as part of our work of being an equitable partnership, and by framing these tensions as existing within *nepantla* we view them as evidence of the progress the local NICs and the broader NIC are making to shift from a dominant to a critical framing. Our next steps within this work include asking the local NICs and the researchers to regularly reflectively journal about these tensions as they engage in action planning and implementation and use these insights to guide our attention during our observations of the NIC meetings.

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