Nepantla in Physics Education Research

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Introduction

- Physics identity is an essential topic in Physics Education Research, PER.
- Often this research examines how physics identities form for primarily white, male undergraduate students in calculus-based physics classes at Tier I institutions (Docktor & Mestre, 2014).
- Less research in PER has engaged with the experiences of marginalized populations, such as students of color, women, and members of the LGBTQIA+ community (McCullough, 2018).
  - There is a body of work outside of PER that considers the experiences of minoritized populations in STEM (e.g. Miller & Downey, 2020).
- Physics students with marginalized identities navigate multiple, often conflicting identities.
- One theoretical framework that explores how individuals navigate opposing identities and realities is Nepantla.
- Here we seek to understand if applying the theoretical framework of Nepantla to PER will offer additional insight into how individuals from marginalized communities both "play the game" and "change the game" (Gutiérrez, 2015).
- This insight can benefit both individuals and institutions that are part of the physics community.

Background and Framework

- A theoretical framework provides the lens through which data is analyzed (Savin-Baden & Major, 2013).
- Early research on minoritized populations in physics used deficit frameworks, comparing minority groups to dominant populations (Docktor & Mestre, 2014).
- Current research uses "critical" frameworks that focus on the systemic structures that disadvantage minoritized populations (McCullough, 2018).
- Nepantla is a critical framework that is applied to individuals with multiple, often conflicting, identities.
  - Nepantla means "in-between space;" it is a liminal space of both being and not being that individuals with multiple identities must navigate.
  - A Nepantler@ is someone who finds an unstable balance between their identities, thus creating new realities that opens space for others.
  - There can be significant risks navigating Nepantla; Nepantler@s may experience both personal and professional cost (Gutiérrez, 2015; Keating, 2006).
- Nepantla differs from intersectionality by focusing on how individuals navigate their realities, rather than on the compounded oppression they experience (Cho, Crenshaw, & McCall, 2013).
- Little research exists in PER that uses the Nepantla framework. Some research exists in STEM-Ed, notably Gutiérrez, who uses Nepantla in Mathematics Education (e.g. 2015). Results include:
  - Becoming a Nepantler@ by sitting in discomfort.
  - How Nepantler@s work within the system to change the system.

Applying Nepantla to PER

Apply Nepantla to existing qualitative PER research.

Case 1: Body projects… (Ong, 2005).
- Framework: Body theory–individuals with conflicting identities modify their appearances in order to be accepted.
- Participants: undergraduate women of color in physics.
- Results: Women who minimized their identities to fit in to physics did so at personal cost. Women who embraced their identities suffered professionally.

Case 2: Educational pathways… (Rosa & Mensah, 2016).
- Framework: Critical Race Theory–focus on three tenets: racism is persistent in America, counter-storytelling gives voice to the silenced, and change occurs when it benefits the white majority.
- Participants: black women physicists.
- Results: Women often chose physics because of educational opportunities. However, they subsequently felt isolated in their departments.

Case 3: Gender discrimination…, Barthelemy, McCormick, and Henderson (2016).
- Framework: Feminist Standpoint Theory–counter-narratives are used to center the perspective of the subaltern.
- Participants: women in graduate physics and astronomy programs.
- Results: Womens' gendered experiences included neutral or positive experiences, microaggressions, and hostile sexism.

Results

Nepantla provides a different perspective from the framework the authors used. Examples:

Case 1: A woman who begins dressing femininely subsequently experiences hostile sexism.
- Ong's analysis: this demonstrates how embracing her identity as a woman, she suffers professionally.
- Nepantla acknowledges the inherent risks in navigating conflicting identities, by accepting these risks, individuals are able to create a safer environment for others.

Case 2: After being excluded from study groups, a woman begins attending these groups rather than waiting for an invitation.
- Rosa's & Mensa's analysis: departments can improve their transparency and provide additional support.
- Nepantla honors this woman as a Nepantler@ and sees this as an example for others to create space for themselves.

Case 3: A woman describes how she always assumed that women could do physics, but realized that this is because her mother held an advanced STEM degree.
- Barthelemy et al.'s analysis: this is an example of a neutral or positive experience with gender.
- The Nepantla framework sees the mother as a Nepantler@ who created this space for her daughter.

Nepantla complements the findings of the authors by providing additional insight into how individuals with multiple conflicting identities can create new realities.

Discussion

- The critical theories used by the authors in these cases are significant in that they:
  - Center the experiences of the women in the studies.
  - Address the systemic biases experienced by the women.
- Nepantla differs from these critical theories in that it:
  - Assumes the biases inherent in navigating conflicting identities.
  - Focuses on how individuals navigate their identities to create new realities that open space for others.
  - Recognizes that this act of creation can be dangerous to the Nepantler@.
- By engaging in Nepantla, these women have found an unstable balance in which they can create their own identities as physicists.
  - This often involves making changes both to the institution and to themselves.
  - These changes open pathways for others to participate in physics.
- In this way, Nepantla provides additional understanding that is empowering to the individual.

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