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Conference Overview

Cultural Perspectives on Learners’ Performance & Identity in Physics

As new research questions have emerged related to the variability of student reasoning and practices across contexts, the community has begun to attend to the relevance of culture and identity in physics learning. In conducting this work, the PER community has begun to draw from fields such as social psychology, anthropology, linguistics, and sociology along with new methodologies associated with these fields.

In particular, these fields offer new ways of thinking about performance. For example, achievement on various assessment instruments (such as FCI, problem-solving tasks, etc.) is a student performance that researchers and instructors commonly focus on. However, other student performances, such as how students talk and participate in ongoing classroom activities, can also offer valuable sources of evidence about understanding and development. Often, careful consideration of these different performances suggests different accounts of student understanding that are in tension with each other (or seemingly incongruent). Socio-cultural theoretical and methodological tools are useful in developing robust and coherent accounts of student understanding that span these different contexts.

The PER community has also begun to explore identity as a lens for understanding student development and participation in physics. Students' past patterns of engagement with other communities may offer productive resources for engaging in disciplinary practices. Similarly, students' engagement with other communities may also sit in tension with typical school science. From a socio-cultural perspective, identity is constantly a work in progress and enacted with others in cultural activities. This perspective draws attention to the fact that the people and artifacts around you influence (and therefore are partially responsible for) your identity and the performance enacted. Examining and characterizing identity in these ways involves drawing on data beyond the individual and using methodological tools that can account for this broader scope.

One of our goals in this conference was to highlight these emerging research directions and draw attention to the theoretical tools and methodological considerations of cultural practice perspectives on learning and performance. This conference brought in national experts from these fields as plenary speakers, strived to exemplify how these perspectives shape the methods, claims, and analyses of learning environments, and tried to foster integration of these theoretical and methodological perspectives into the work of the PER community.

Organizers:
Ayush Gupta, University of Maryland, College Park
Eleanor Sayre, Kansas State University
Chandra Turpen, University of Maryland, College Park
Jessica Watkins, Tufts University

The organizing committee of the PERC 2012 would like to express gratitude to the following individuals for their invaluable assistance:

The schedule for the 2012 PERC conference was modified during the conference to address various issues that arose as follows:

**Wednesday, August 1**

3:30 pm – 6:00 pm  PERC bridging session  Inn at Penn  Woodland Ballroom
6:00 pm – 6:30 pm  Poster set-up  Houston Hall  Hall of Flags
6:30 pm – 8:00 pm  PERC banquet  Sheraton  Ben Franklin Ballroom
8:30 pm – 10:30 pm  Contributed poster session  Houston Hall  Hall of Flags
8:30 pm – 9:30 pm  Odd-numbered posters
9:30 pm – 10:30 pm  Even-numbered posters

**Thursday, August 2**

All sessions held at the Sheraton

7:30 am – 8:15 am  Breakfast  Ben Franklin Ballroom
8:15 am – 11:00 am  Morning plenary session  Ben Franklin Ballroom
8:15 am – 9:45 am  Plenary talks
9:45 am – 10:15 am  Coffee break
10:15 am – 11:00 am  Plenary discussion
11:15 am – 12:45 pm  Morning parallel sessions  Breakout rooms
12:45 pm – 2:00 pm  Lunch  Ben Franklin Ballroom
2:00 pm – 3:30 pm  Afternoon parallel sessions  Breakout rooms
Plenary Sessions Abstracts

AAPT/PERC Bridging Session
Inn at Penn, Woodland Ballroom
Discussant: David Hammer, Tufts University
Moderator: Leslie Atkins, California State University, Chico

Where do physics students come from and what do they become? A look at knowledge and identity pathways through and beyond school experience
Reed Stevens, Northwestern University

Abstract: In this talk, I will present a perspective that conceptualizes learning in cultural practice terms. Cultural practices are differently 'sized' patterns of interaction among people and things to which people orient and hold each other accountable. Learning then involves coming to participate in these patterns of interaction and undergoing possible changes to body, mind, and identity in the process. Cultural practices are often knotted together to make normative cultural paths, through and around which people traverse specific pathways. Drawing on a conceptual framework for studying young people's learning pathways toward "becoming" engineers (Stevens et al., 2008), this presentation will examine the knowledge and identity formation processes in everyday physics, physics education, and professional physics. I will consider an additional dimension of importance, how people individually and with cultural support, navigate through sanctioned institutional passage points and rituals. I will use this framework to generate a set of future-looking questions for physics learning and physics education research.


Practice-Linked Identities, Social identities, and Mathematics Learning
Indigo Esmonde, University of Toronto

Abstract: I will talk about two different ways of thinking about identity as it relates to learning, and discuss the importance of integrating both perspectives. First, I'll talk about practice-linked identity: a sense of self that develops through participation in a set of cultural or collective practices. These identities are shifting and changeable, and are developed in relation to other people in the context. Second, I'll talk about social identity: a sense of self --or a perception of others -- based on socially meaningful categories like race or gender. These identities are seen as quite static (although they may not be experienced that way) and are related to broader systems of oppression in society. I will give examples from my research in mathematics education, and discuss how these concepts can be useful in the study of physics education.
**Morning Plenary Session**  
*Sheraton, Ben Franklin Ballroom*  
*Discussant:* Noah Finkelstein, University of Colorado at Boulder  
*Moderator:* Hunter Close, Texas State University–San Marcos

**Cultural variations in epistemological orientations: Impacts on knowledge, meanings, and reasoning about the natural world**  
*Megan Bang, University of Washington*

*Abstract:* Increasingly, learning scholars have focused on how race, culture and class have been used to define deficit-oriented discourses about students from non-dominant communities understandings, thinking, experiences, and language use (e.g., what comprises an effective explanation or convincing data; what "smart" looks and sounds like) and restrict the intellectual opportunities these youth have to learn in school (e.g., Lee, 2009; Gutierrez et. al, 2009; Barton & Tan, 2008). We have sought to understand how these issues place epistemological demands on Indigenous students, specifically in thinking and sense-making about the natural world towards the goal of creating more affective learning environments. Through a micro-analysis of two contexts, one an informal interaction between a child and their parent, and one in a learning environment, I explore how relational epistemologies, and variations in causality and inference are embedded in these issues and raise questions and possibilities in the design of learning environments.

**When Everyday and Scientific Concepts Grow Into One Another: Syncretic and Connected Learning**  
*Kris Gutiérrez, University of Colorado at Boulder*

*Abstract:* As schools become increasingly irrelevant to meaningful learning for young people, they also fail in fulfilling their social equalizing agenda. There is a growing disconnect between the interests and everyday practices of our nation’s students and formal schooling’s approaches to engaging them in rigorous, meaningful, and relevant learning. Of concern, there are social and cognitive, as well as personal, institutional, and economic consequences to disconnected learning. Today’s students move across a range of contexts and produce artifacts that reflect the intercultural, hybrid, and multimodal practices of which they are part. These repertoires developed across the ecologies of interest and everyday life should be cultivated as important dimensions to consequential learning. From a cultural historical learning perspective, transformative learning involves shifts between and across new combinations of contexts and tools that can be leveraged across ecologies and domains of learning (Engeström, 2003; Gutierrez, 2008). Drawing on the best of what we know about how people learn, this paper focuses on how we can ratchet up learning across a range of ecologies by designing openings and forms of support that create opportunities for new learning pathways into the future. In particular, it focuses on the affordances of syncretic and connected learning approaches in supporting the development of toolkits that have utility across tasks, purposes, disciplinary boundaries, learning environments, and future-oriented trajectories and identities.