I-Engineering & Identity Work

We ground our R&D in social practice & sociocultural theories of identity and learning. Who one is, in the past, present and *possible futures*, is informed by the encounters one has with others while enacting new practices and activity (Lave & Wenger, 1991). Different from psychological studies (which situate identity as a personal attribute) who one is *and who one is becoming*, at any given moment, is always under negotiation and contingent upon the resources to which one has access (Wortham, 2006). As individuals move across settings and time (such as through middle school science), they are exposed to, positioned by, and react to a range of people as well as institutional and cultural structures and forces, such as school, or societal narratives around who is good in science or who can be an engineer (Holland & Lave, 2009).

As individuals join new communities of practice, such as their classroom-based engineering design community, they call upon salient practices and ways of being that are learned in that community, as well as from other places (Nasir, 2011). These actions can position one as either central or marginal to their new community depending upon how they are received by others (Danielak et al, 2014). For example, at the meso level, how students leverage their knowledge of community concerns and values could be positioned by the teacher or peers as either important or not, to doing engineering. At the macro level, how students come to the science classroom seeing themselves as capable in engineering is influenced by broader sociohistorical narratives around who can be an engineer.

In our work, we focus on how identity development happens in the moment and its relationship to the learning environment. The cycles of action that happen in the classroom shape identity development over time. In *I-Engineering* we are particularly concerned with how the powerful narratives, traditions, and histories that demarcate identities in engineering or in science class become disrupted and reformed as teachers and students engage in the engineering design process.

We focus on **three observable and tractable dimensions of identity development in engineering**: 1) one's developing **knowledge and practice** within a community of practice (*e.g.*, engineering practices); 2) **recognition** by others (*e.g.*, Is one accepted by others as the person they desire to be and with the salient expertise?), and 3) **positioning/agency** (*e.g.*, Does one see herself as capable, and able to leverage an array of resources to gain understanding and take action?). We do not suggest that all students should "love engineering." Rather, we are more interested in how, when and why youth identify with engineering.

PIW trajectories: over time and space

- Situated within broader sociocultural and historical narratives, which are shaped by context (school, afterschool, peers, home, etc.)
    - Broader disciplinary narratives "what it means to be scientific
    - Normative education narratives "what it means to be a good student"
    - Cultural narratives "what it means to a girl, a boy, African America, etc."
- Identity work occurs over time, leaving traces and building towards identity trajectories (the "socio-spatial structuring of identity over time," Leander, 2002, p. 208)
- Identity work carries momentum: the value a individual places on science/engineering, and her interest, commitment, persistence, and/or motivation to pursue science/engineering learning.