INSTITUTE FOR SCIENTIST & ENGINEER EDUCATORS

Equity & Inclusion

Improving equity and inclusion in STEM involves many considerations, driven by multiple areas of research. ISEE has developed research-informed "focus areas" in Equity & Inclusion that are emphasized in our professional development and that inform our other programs. Unlike the inquiry "elements," which provide a relatively complete framework for thinking about inquiry, the focus areas in the Equity & Inclusion Theme are not intended to provide a complete framework for thinking about equity and inclusion in STEM. Instead, the Equity & Inclusion focus areas provide some fruitful, practice-oriented lenses for viewing the design and implementation of STEM learning environments. These focus areas can prompt and guide revisions and redesigns furthering equitable and inclusive STEM workforce development.

PDP participants read a relatively complete and referenced document on the ISEE Equity & Inclusion Theme. Brief synopses of the focus areas follow:

Multiple ways to productively participate

More learners are included, and more of their skills are developed, when they have multiple ways to engage, learn, communicate, and succeed. Inclusive teaching supports differences in how people learn, work, and communicate their ideas. Learners' backgrounds, their past participation in various communities, and the ways in which they are engaged in activities all shape whether and how they communicate and demonstrate success. Successful outcomes can look and sound very different for different learners. In addition, authentic STEM contexts feature teams of collaborators with diverse ways of learning, working, and communicating. STEM learning experiences that mirror these productive collaborations must, therefore, allow for multiple ways to productively participate.

Designing STEM learning experiences with clearly-articulated learning goals or expected project outcomes, and providing multiple avenues for learners to achieve goals and demonstrate success, supports more learners succeeding. ISEE participants are charged with designing a learning activity in which the learners gain an understanding of an important concept, but can take their own path in getting there. This requires that learners be provided with different ways, and ongoing opportunities, to express their prior knowledge and skills in a supportive environment.

Learners' goals, interests, and values

People bring to STEM learning environments their different goals, interests and values. These are shaped in part by their backgrounds, and affect the outcomes. Learners have different views of intelligence, mastery, motivation, and agency that can affect their goals and values. Instructors and mentors can find out about their learners' backgrounds, draw from them as resources, and help learners find connections and relevance to their own lives. For example, ISEE participants may design an activity so that learners can pursue a question and/or investigation path that interests them most, while still leading to the intended learner outcomes. ISEE participants work to design effective learning environments that anticipate and leverage learners' goals, interests, values, and sources of motivation through activities that are relevant, meaningful, and challenging.

Beliefs about learning, achievement and teaching

Learners, instructors, and mentors hold different beliefs about learning, intelligence, achievement, competency, and teaching. They bring these beliefs, which include explicit assumptions and unconscious biases about themselves and others, into the learning environment. Subtle aspects of the learning environment can trigger negative stereotypes and intensify learners' assumptions about themselves, and consequently can negatively impact learners' performances. Conveying positive and equitable views of learning, and projecting high expectations along with support for all learners' achievement provides opportunities for more learners to be successful. One way that the ISEE community does this is by approaching intelligence as a malleable, rather than fixed, trait, and encouraging strategies that emphasize practice and improvement. This mitigates messages of "either you've got it or you don't" which are often (intentionally or not) disproportionately applied to particular groups. ISEE participants identify their own beliefs about teaching and learning, and reflect on how that may impact learners.

Developing an identity as a person in STEM

Learners have multiple and overlapping social identities. They also have beliefs and preferences about how others view them and their identities. A growing body of evidence links the development of a positive STEM identity (seeing oneself as a "science or engineering person"), persistence in STEM, and the choice to pursue a STEM career. Researchers have identified factors that lead to a positive STEM identity, which include gaining a sense of, and being recognized for, one's own competency in STEM. ISEE participants design activities that develop competency in STEM concepts and practices, while giving learners many opportunities to demonstrate and be recognized for that competency. ISEE participants' work explicitly gives learners practice within the culture of STEM (which has its own norms and values like any other culture). This practice within STEM culture begins to address learners who are discouraged or marginalized from participation, recognition, or identification with STEM.