

Promoting Equity through Assessments in Secondary Science Classrooms

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Overview: In this research + practice partnership project, high school teachers and researchers co-designed multiple forms of curriculum-embedded assessments and studied the role of unconventional forms of assessments in expanding minoritized students' opportunity to learn in high school physics.

AUDIENCE: Teachers; teacher educators; administrators; curriculum developers; Policy-makers.

KEY POINTS

- In order to address inequity and injustice in disciplinary classrooms, we need to expand what it means to learn and be good at science, while moving beyond the “inclusion” or “access” paradigm of equity.
- Co-designing classroom assessments present opportunities for educators and researchers to critically reflect and disrupt the narrowly defined meaning of disciplinary learning and mastery built into conventional teaching and learning at school.
- Unconventional assessments function to challenge and expand normalized ways of doing and being good at science for a particular group of students in a particular context, while facilitating students to deeply connect themselves to academic tasks.
- The use of unconventional forms of curriculum-embedded assessment can increase minoritized students' opportunities to learn *if* the assessment facilitates minoritized students to personally and deeply relate themselves to academic tasks.

INTRODUCTION In this research+practice partnership project, high school physics teachers and researchers co-designed a unit about momentum to expand minoritized students' meaningful opportunities to learn (OTL). Specifically, the unit was designed to: (a) expand what it means to learn and be good at science using unconventional forms of assessment, (b) facilitate students to leverage everyday experiences, concerns, and home languages to do science, and (c) support teachers to facilitate meaningful dialogical interactions. The analysis focused on examining minoritized students' OTLs mediated by intentionally designed, curriculum-embedded, unconventional forms of assessments. The participants were a total of 76 students in 11th or 12th grade. Data were gathered in the form of student assessment tasks, a science identity survey, and interviews. Data analysis entailed: (a) statistical analysis of student performance measured by conventional and unconventional assessments and (b) qualitative analysis of two Latinx students' experiences with the co-designed curriculum and assessments.

FINDINGS The analysis of student performance and stories demonstrated that students from racially, socioeconomically, and linguistically disadvantaged communities had opportunities to engage in science meaningfully while deepening their understanding about the focal phenomenon in the co-designed unit. In-depth analysis of both quantitative and qualitative data suggests that conventional and unconventional assessment had different affordances for students from different backgrounds, intersecting with both students' identities and historical

relationships with the discipline. Together, the analysis points to the potential of expanding minoritized students' OTL in secondary science classrooms by using a deliberately designed, curriculum-embedded, unconventional form of assessment, in combination with conventional ones. The analysis suggests two roles of unconventional assessments in promoting equity. One is expanding *both* what to assess and how to assess it. The other is making the boundary of school science flexible and porous by centralizing students' identities, cultural experiences, and home languages in doing science at school.

TAKEAWAYS First, we encourage *science educators* to design and use unconventional forms of assessment tasks, in addition to conventional ones, that students can relate themselves to deeply and personally. What might be a different and creative way that students can express their thinking and identities? Second, we recommend *teacher educators* to first provide opportunities for teachers to experience a well-designed unconventional assessment as students through teacher educators' modeling, and then unpack how and why such assessments can expand minoritized students' opportunities to learn and succeed. Lastly, *policy makers* must also consider how to disrupt the state- and district-level assessments in a way that supports expanding minoritized students' OTL at school. Without the disruption of the assessment system at scale, it continues to be challenging for teachers to use a creative, deeply personal, unconventional form of assessment in classrooms.

Full Title: Expanding opportunities to learn in secondary science classrooms using unconventional forms of classroom assessments