

Bringing Selves to the Science Curriculum: Transforming Identity Trajectories as a Goal for Educational Design and Evaluation

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Abstract

Educational researchers typically evaluate curriculum in schools by measuring how much knowledge students learn from engaging with materials. This paper explores the idea that a goal of educational evaluation should be to assess how well programs help to *transform the identity trajectories* of students who participate in educational experiences. By identity, we refer to the work young people and others in their networks do across a range of contexts to develop and pursue interests that allow them to project themselves into the future. Identity formation is fundamentally a social activity: identity trajectories depend on the development of relationships with others who can recognize emerging interests and broker access to opportunities to develop those interests and have them rewarded and sustained. In this context, two central questions for evaluation of curriculum are: How well can curricular experiences support young people in becoming who they imagine they could be? How well do curricular experiences help others in schools and other contexts support the development of those interests and connect them to the people that can advocate for them in the next stage of the young people's participation in particular practices and learning? In this paper, we explore how these questions could organize an evaluation of an elementary science curriculum unit, *Micros and Me*, which has as an aim bringing students' home and community experiences into the classroom so that they become central to the experience of teaching and learning science.

Paper Summary

Educational policymakers emphasize the need to evaluate curriculum in schools by measuring how much knowledge students learn from engaging with instructional materials. The measures of knowledge are most often standardized tests, administered annually and tied to sanctions and rewards for schools that perform well or poorly on those tests. Curricular innovations that can improve scores on these tests are of great value to schools, and under current policies, schools are particularly encouraged to adopt curricula that experimental studies show are good conduits for the development of academic knowledge in students as measured on these tests.

Within this regime, little examined are the longer-term effects of curricula on the social futures of the students (O'Connor & Penuel, 2009). We know that there can be a compelling, lasting personal identification with disciplinary pursuits as a result of informal learning experiences (Bell, Lewenstein, Shouse, & Feder, 2009), but the

same cannot be stated for formal instruction. In fact, there is often scant evidence to support popular notions that particular curricular experiences or topics are necessary conditions for later success, even in developing disciplinary knowledge (Roschelle, Singleton, Sabelli, Pea, & Bransford, 2009). The narrow focus of most curricular innovations leaves little room to consider the necessary identification with institutional, disciplinary practices and navigation through systems required to become a full participant in a disciplinary community (Stevens, O'Connor, Garrison, Jocuns, & Amos, 2008). Nor does this focus consider as significant what students bring to curriculum, including the ways of seeing, valuing, and acting in the world they bring from the varied cultural practices that characterize their families and communities (Gonzalez, Moll, & Amanti, 2005).

An alternate view of curriculum and its effects conceptualizes curriculum as a site for identity development, where participants (both teachers and students) engage in acts of exploring, translating, positioning, and responding in ways that orient them to and propel them into new social futures. As a site for identity development, curriculum is only likely to take on significance for young people if it makes the boundary between classroom and outside life permeable and in a way that allows young people to bring and explore their interests, their cultures, and their communities as part of curricular activities (McDermott & Webber, 1998). Curriculum can encourage translation of ideas into and out of disciplinary ways of thinking and doing, not just focus on the eradication of misconceptions about the natural world. Curriculum can enable students to position themselves vis-à-vis disciplines and one another, in ways that recognize their agency, interests, and knowledge (Lee, 2001). Curriculum also enables response, not just by students, but also by teachers, peers, caregivers, and other adults to the emerging interests and identifications of young people, in ways that connect them to learning resources and experiences and to people who can advance them toward a future of their choosing.

This paper explores the idea that a primary goal of educational evaluation should be to assess how well programs help to *transform the identity trajectories* of students who participate in curriculum activities. By identity, we refer to the work young people do across a range of contexts to develop and pursue interests that allow them to project themselves into the future. This includes acts of social positioning and identification that take place within classrooms, as part of discipline-based, institutionalized practices of teaching and learning (e.g., Bricker & Bell, 2008; Hegedus & Penuel, 2008; Wortham, 2004). But evaluating a curriculum's success in transforming identity considers also organized out-of-school activities where acts of translation and response may occur (Gutiérrez, 2008; Heath & McLaughlin, 1993), contexts that may require young people to organize themselves, so that they can pursue or develop an interest (Bricker & Bell, 2009; Heath, in preparation), possible selves (Markus & Nurius, 1986), and new imagined futures.

Evaluating a curriculum from the standpoint of how well it supports a particular person or cohort's identity trajectory is challenging, though, since one's own future is never only the product of curriculum or of an individual's imagination. Identity

trajectories depend on the development of relationships with others who can recognize emerging interests, stabilize social reputations around those interests, and broker access to opportunities to further develop those interests and have them rewarded. The idea that individuals' identity choices depend on recognition by others is one that has been developed both within psychology (Erikson, 1968; Mead, 1934; Sampson, 1993) and philosophy (Ricoeur, 2005; Taylor, 1992). Recognition is fundamental, because identities are formed not in isolation from but in dialogue with others (Hermans & Kempen, 1993); identifications expressed in talk and gesture both respond to and anticipate audiences in the speech situation and cultural representations that circulate in the worlds they inhabit (Penuel & Wertsch, 1995). Furthermore, *who* recognizes an identity is important: many, if not all young people need people who can serve as cultural brokers (Cooper, Denner, & Lopez, 1999) or sponsors (Brandt, 1998) with whom they have a close relationship and who can help them gain and maintain access to powerful opportunities to develop as persons. Identities are never "achieved" as Marcia (1966) in psychology once proposed; they always contingent, never finished, so long as we are alive, and any one set of relationships can provide us with only some of the resources we need to imagine and become our future selves.

With a focus on understanding the identity trajectories of participants, two central questions for evaluation of curriculum are:

- How well can curricular experiences support young people in becoming who they imagine they could be?
- How well do curricular experiences help others in schools and other contexts support the development of those interests and connect them to the people that can advocate for them in the next step young people wish to take?

In this paper, we explore how these questions could organize an evaluation of an elementary science curriculum unit, *Micros and Me* (Tzou, Bricker, & Bell, 2007), which has as an aim surfacing students' home and community practices in the classroom so that they become central to the experience of teaching and learning science. The ways students are intended to engage with materials and practices of the curriculum connect authentic scientific practices deeply with students' areas of everyday expertise and provide teachers with the opportunity to develop repertoires of practices that are more deeply culturally relevant (Ladson-Billings, 1995) to multiple classroom participants.

Three practices of the curriculum and its design team provide opportunities for young people to bring and develop interests in the contexts of learning about topics at the intersection of the traditional school domains of health and biology. The first is a technique we call *self-documentation* to elicit students' everyday practices around health. Self-documentation is a photo-elicitation technique from the health field (Clark-Ibañez, 2004) that allows teachers and students to see, from the students' point of view, how youth engage in cultural practices outside of school that relate to the focal topics of the curriculum unit. The second practice is the explicit incorporation into the curriculum of opportunities for students to pursue and

explore a topic of their own choosing, related to the topic at hand. Student choice, even within so-called “inquiry curriculum” in science education is rare, in part because it imposes significant challenges for teachers to manage multiple questions of students in the context of group instruction (Kemp, Tzou, Reiser, & Spillane, 2002). *Micros and Me* addresses this challenge by scaffolding individual and small group research practices, leveraging topical resources from year-to-year, and enlisting the assistance of family members and other adults in the research project inquiry. A third practice of the team is their formation of enduring relationships not just with teachers, but with young people and in some cases their families, which enable them not only to learn about the curriculum’s shorter- and longer-term effects from different perspectives but also to serve in some instances to broker access to new learning opportunities and resources young people may want to pursue (Bell, Bricker, Reeve, Zimmerman, & Tzou, in preparation).

The team has already studied how well experiences in *Micros and Me* support young people in becoming who they imagine they could be, in their adaptation of projective techniques that have been used for many years in the field (the “Draw-a-Scientist” task; Chambers, 1983). In addition, the team has used the self-documentation and ethnographic studies of individual students to trace how ideas and practices travel in and out of the classroom (Bell, et al., in preparation; Bricker & Bell, 2009; Reeve & Bell, 2009). But as we imagine it, a fuller evaluation would begin to consider what might be called the “far-end” of the learning trajectory (O’Connor, this volume), that is, what social futures might become desirable to and become imaginable to young people as a result of their participation in the curriculum. It would focus on how young people come to understand trajectories of discipline-related participation (Stevens, 2000) as well as the translations that young people make, particularly across traditional boundaries, and how the curriculum facilitates these translations, both through specific activities and also by its very structure, which sits between school science and health as topics of study. Further, where past studies have focused on how teachers learn from and with the curriculum materials through professional development (Tzou & Bell, 2009), an evaluation focused on transformations of identity trajectories would focus much more intently on the role of teachers, parents, and other adults play in supporting identifications emerging from young people’s experiences and how they broker ongoing participation in relevant practices.

The approach we envision for evaluating *Micros and Me* poses its own set of challenges, even as it attempts to provide an alternative to the narrow focus on content knowledge within most educational evaluation studies. For example, the many acts of brokering and sponsorship by caregivers and other adults that may be necessary to help a young person grow and develop particular interests are not readily accessible to evaluators, and they may take place after the evaluation has concluded and in ways that are disassociated from the curricular experience from the perspective of the participants. Further, although the roles teachers’ play may be more visible or accessible to evaluators, schools as institutions may preclude them from doing so. These are important challenges to confront, in our view, and lead to

more productive forms of discourse than do debates about transfer and what constitutes “scientific evidence” for the effectiveness of curricula. They push us to consider more than what young people are becoming, to also ask ourselves, what are our roles in that process that extend far beyond designing and studying materials and technologies for classrooms.

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