

# relating research to practice

## Making current research on science learning accessible to ISE

### About the Project

RR2P makes current research on informal learning available to ISE educators:

- Synthesizes results of peer-reviewed studies in plain English
- Selects and curates studies relevant to ISE needs
- Provides meta-tags and search functions

### About the Collection

- 237 briefs, and counting
- 10K visits in last quarter
- Cross-posted on informalscience.org

### Research Brief Design

Relating Science Identities with Gender, Race, and Perceptions of Expertise Across Settings | Current Research  
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#### Research Brief

by Molly Shea

Negotiating Science Identities with Gender, Race, and Perceptions of Expertise Across Settings



This three-year study focused on girls' engagement with science and how they negotiate identities with and in opposition to science in a community-based afterschool program. The study Rahn reports on here is part of a larger multi-sited ethnography of learning and identity in science. She observed girls whose families had recently immigrated to Montreal, Canada and were participating in an afterschool program focused on creating science newsletters and science for projects. These observations were supplemented by interviews with students and instructors. Twelve girls from ages 11 to 14 participated in the activity each year (2009-2011). The students' families had mixed immigration histories coming from Morocco, Congo, Cameroon, Greater Antilles, Bangladesh and Sri Lanka.

#### Research Design

The study was designed to highlight two important factors when considering long-term identity development and engagement with scientific activity. First it highlighted the way experiences across places (at home, in school, across cultural practices, in afterschool programs, and other informal science environments) contributed to girls' understanding of recognized science practices and expertise. Second it highlighted the importance of recognizing the ways of contradiction that these girls encountered as they positioned themselves vis-a-vis the field of science where women of color are underrepresented.

#### Theoretical Basis

This study explores science literacy development grounded in sociocultural theory and extensions thereof (Cunha and Hooff 2005; Lanks 2005). The study also draws upon network theory (Nasir 1994, 2004) and social theory in geography (Hess 1980; Siga 1988; Vaidenbrouwer 2009) to understand how students negotiate science in science alongside under-represented identities and trajectories within science once understood in terms of gender, ethnicity, and race. Rahn argues that to space-time dimensions of engagement in science to better understand how students build identities that run counter to

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powerful narratives about who can become scientists and may successfully engage in scientific practices in their daily lives.

#### Summary of Results

The creation of a newsletter focused on science literacy and provided a place for girls to grapple with and bring ideas from other settings into their discourse of science. Scientifically literate youth can use scientific practices and understandings for social action in ways that are empowering to them (Beau, Calabrese Barton, and Tan 2010; Bell et al. 2009). In this study girls designed a science newsletter as a way to build-up and play with science literacy practices. The activity provided a space for students to grapple with what counts as science in that space as they talked through ideas for articles within the newsletter. It also became a place to negotiate knowledge practices from other areas of their life and try to make connections across practices. For example one girl, whose country of origin is India, chose to write about elephants for her science article.

Rahn noted that, together, with a youth assistant, the girl discussed some of the symbolic meanings of elephants in India. For example, the elephant's "have being high up in the air bringing good luck" and then they discussed different ways to approach a scientific text on elephants, talking about its threads for survival, differences due to its place of origin, such as those from Asia as opposed to those from Africa" (Condensed Fieldnotes, January 8, 2010). In this negotiation Rahn points out that what counts as science in that setting is narrowly defined. Although knowledge from other settings is encouraged in this exchange, the teaching assistant brought the conversation back to a scientific view of science—one where knowledge of science is unproblematic and present in its students, but students are not engaged in scientific inquiry. The science text by contrast, focused on creating new scientific inquiries to be carried out by the girls. Both activities became tools for local meaning making as the girls took on insider and outsider roles as scientifically engaged. Rahn also explored two girls' trajectories of identification with science over time (2002-2011) which offers rich insights into the manner the two girls negotiated the opportunities for engagement in the program in different ways. That negotiation was also driven by the cultural and social capital the two girls brought to the program with one trajectory leading to a negotiated trajectory into science, while the other remained marginalized.

#### Implications

Providing scientific material in the curriculum does not necessarily receive or help students build new identities that address contradictions between existing science identities and gender, race, and class identities. Scientific literacy is multi-dimensional and can engage students in critical ways of thinking, doing and talking about science, however science literacy practices are targeted up in complicated ways of activity that are demarcated by white, male identities and cultural practices. The newsletter, for example, allowed girls to take up identities as science journalists with the explicit position that they did not want to practice science, but rather share scientific findings with others. Rahn argues that this position might have been a more acceptable negotiation of gendered roles with the scientific field as the girls perceived it. Exposing girls to science in new ways through the creation of science newsletters, science does not necessarily lead to alternative scientific identities for underrepresented groups. However, there were instances when girls were able to play with ideas from multiple contexts, build new science inquiries, and combine understandings from multiple epistemological stances to author long-term science identities.

#### Brief Citation

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Our team of ex-ISE professionals/current doc and postdocs synthesize research articles and send to original authors for review and sign off

Briefs describe research goals, methods, and underlying theoretical perspectives.

Briefs describe the results of studies in detail to invite science educators to consider how to adapt ideas to different settings.

In the implications section, we extrapolate from the research to suggest adaptations of research to ISE settings.

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### Coming Soon: Connected Collections

This fall we will begin to create bundles of 4-6 research briefs related to key topics – e.g., gender equity, science learner identity development, formal and informal connections, and others -- with ideas for how to use them for staff development discussions and reflections.