Summary

Education researchers and practitioners are increasingly recognizing the need for learning in informal settings to complement formal science learning (Bybee, 2001; Falk, 2001). Informal science education may be critical in meeting the goals of reform and in keeping students and the public informed of advances in science. As such, greater attention has been given to learning in informal science education settings.

A growing body of research in informal learning environments examines how groups engage in learning conversations to make meaning from content and exhibits in these settings. The National Research Council (2009) speculated that individual and group identity might be shaped and reinforced during such learning conversations.

The purpose of this study was to gain insight into the ways identity as a learner of science was constructed during learning conversations at a science camp. Findings from this study suggest implications for the professional development of informal science educators.

Central Research Question

What is the role of conversation in influencing science learner identity development during an informal science education camp?

Theoretical Framework

Identity theory

Identity is about becoming and being recognized as a certain type of person (Gee, 2001:111). Identity is considered social, socially constructed, context dependent and an ongoing process of negotiation (Olity, 2007; Roth & Tobin, 2007; Varelas et al., 2007). Gee (2005:111) argued that we use language to identify at the right time and in the right context to get recognized as a certain type of person.

Nairst (2002) argued that learning is about becoming as well as knowing and how the learning setting affords ways of becoming is central to understanding learning. Varelas et al. (2007) stated that seeing oneself as a capable learner is an important component of one’s identity as a learner of science. As an identity as a capable learner can influence the practices an individual engages in as well as the trajectories available to the learners within these practices (Nairst, 2002).

Wenger’s (1998) identity theory postulated that members belong to multiple communities. He contended that the process of brokering helps to connect the boundaries of these various communities. In terms of learning science, the various communities to which the learner belongs must be connected for the individual to imagine a trajectory of full membership in the community of science learners.

The conversations that participants engage in during social interactions in informal science education camp would guide learners in viewing themselves in the community of practice of a learner of science.

Study Design and Methodology

• Qualitative Case Study

Creswell (2003) identified case studies as a method in which, “the researcher explores in depth a program, an event, an activity, a process or one or more individuals” (p. 15).

Case Description

Marine Science Consortium (Wallops Island, VA)

Coastal Ecology Field Trip Program

Coastal Ecology Program activities: science lectures, hands-on activities, research cruises, field-based experiences, & laboratory exercises

Sample Science Camp Activities

Science Camp Activity

- Physical Oceanography Observations
- Water Quality Testing
- Marine Organisms Lab
- Interfacl Field Experience
- Marsh Field Experience

Description

- Current cross, Secchi disk, Flora & Flora Chart
- pH, Dissolved Oxygen, Salinity
- Taxonomy, Marine organism identification, Dichotomous keys
- Estuarine ecosystems & patterns, Zoos of the marsh

Study Participants

- Hannah: Participant MS, F, White, Red
- Bryn: Participant MS, F, White, Blue
- Dake: Participant MS, M, White, Green
- Cole: Participant MS, F, African, Brown
- Jordan: Participant MS, M, White, Black
- Emma: Participant MS, F, White, Yellow

The Corpus of Data and Analysis Methods

Event Participants: Seaing and Taxonomy

- Observation: Seaing and Taxonomy
- Data Collection: Marine Organisms Lab
- Video: Seaing and Taxonomy
- Audio: Seaing and Taxonomy
- Videotape: Seaing and Taxonomy
- Transcription for verbal interactions
- Audiotape: Seaing and Taxonomy
- Transcript of observations

Influential Features of Science Camp Activity

- Focus on Affordance of Learning Environment
- Access to Science Tools
- Novelties

- The focus on affordance of learning environment
- The tools and equipment used by professional scientists
- The learning experiences that are new and unique to learners.

The Role of Learning Conversations

- Language Use
- Sense-making practices
- Positioning
- Alignment
- Power Dynamics
- Seeing Others in New Ways

- Language use and everyday language to make sense of the terms
- Individuals put themselves in categories relative to one another in relation to cultural and social norms and practices.
- Coordination and alignment of activities to fit within a community of practice.
- Active involvement in the process of negotiating meaning.
- The ways that individuals exert power and control over one another.
- Seeing more members of a community and developing new relationships and views of others.

Implications for Teacher Education

The data collected from this study can provide insight for teacher education in informal science environments and guidance for professional development opportunities for informal science educators. A finding from the study was the role informal science education at the MSc played in facilitating learning conversations and the construction of identity for learners. This study suggests that fostering learning conversations and identity development for instructors and participants of informal science education programs is a fruitful area for professional development of informal science educators.

Recommendations for PD of Informal Science Educators

- PD that challenges educators to introduce pedagogic questions and theories of learning and teaching
- Instruction in science methods to construct meaningful learning experiences in science education
- Content that facilitates an understanding of the role of learning and the influence of PD on one’s practice of teaching and learning

Anticipated Outcomes

- Educators will design their own PD and strategically collaborate to create authentic learning experiences that facilitate meaningful learning and teaching.
- Educators will also be able to work collaboratively with teacher educators to develop a shared understanding of science education.
- Educators will develop their own PD and strategically collaborate to create authentic learning experiences that facilitate meaningful learning and teaching.