

**Association of Science- Technology Centers Annual Conference  
St Paul, MN Saturday November 8, 2003**

*Session: Center for Informal Learning and Schools: Current Research*

Convenor: Bronwyn Bevan, Director Center for Informal Learning and Schools

Presenters: Barbara Rogoff, UC Santa Cruz, Jonathan Osborne, King's College London, Mark St John, Inverness Research Associates

Discussant: Leona Schauble, Vanderbilt University

**Opening Remarks**

CILS is a university-museum collaboration that consists of research, doctoral and postdoctoral programs, and a leadership development initiative for museum-based teacher educators. CILS faculty and students come from the natural sciences, the social sciences, science education, and the world of museums and other informal science institutions (ISIs). The cross-disciplinary, cross-institutional community of CILS educators works together to examine three aspects of work in our field:

- the nature of informal learning
- learning in informal institutions
- how informal and formal systems of education can most effectively align and connect to support K12

Before I give you some specifics about CILS, I want to situate it for you, within the national science education reform efforts. CILS is funded primarily through the NSF CLT initiative, which is a \$100+ million investment in the K12 science infrastructure and leadership of this country. All of the 13 CLTs now funded look at curricular, learning design, or teacher preparation issues relating to science or mathematics teaching. They each take a particular piece of the puzzle, for example: whether about equity in mathematics, or science education in rural regions, or assessment of student science learning. The long-term goal at NSF is to build knowledge and leaders who can take the country forward with respect to improving science and math learning for all.

It's interesting to note that NSF required that all CLT proposals include an ISI as one of the partners. In addition, they funded CILS to focus specifically on the system and resources of ISIs—both in terms of how they can contribute directly to k12 (through teacher PD, field trips, and curriculum) as well as indirectly by supporting the cultural relevance and accessibility of science to students, their

families, and their communities (which includes their teachers and those who make school policy decisions).

There is also a sense that the ISI community understands something about learning and about teaching science that may be important in the efforts to change the way science is taught so that all students, not just the elite few, can learn and experience science. And there is a sense that we, as a field and a system of educators, can learn and improve too, by working with others outside of our field.

This focus on K12 is, of course, only one small part of what museums do—the far greater part of what we do is work with non-school communities. And we think about, and construct and curate the cultural and societal relevance of our science disciplines or collections. Nevertheless, at most of our institutions our work with school audiences is growing. Partly because we have a lot of resources and expertise, and we can see that the school system, that hatchery of future citizens and cultural bedfellows, is in dire need.

There is a metaphor that likens walking through a museum to walking through the woods. One's eye is caught by the light bouncing off a stream. Suddenly the sound of a bird makes one turn one's head and look toward the branches overhead. This beautiful, and apt, metaphor suggests that the experience of learning in the museum comes from within one's self, and what one is prepared to notice. It also assumes that we all are intrinsically curious and that learning starts from there.

While I entirely agree with this metaphor as one descriptive of the museum learner's experience, the key idea that it glosses over is that we are walking in a 19<sup>th</sup> century English Garden. The trees have been imported and planted just so. The clearing is found at a certain number of paces along the walk. The bird populations are kept at stable levels—let the poachers beware! The whole experience is quite carefully sequenced and clustered. In this aspect of designing for experience, for the gestalt as well as for the specific, and for capturing the imagination, stimulating conversation, and sparking curiosity, we may also have something to contribute to K12 science education. We have some knowledge about creating the conditions for learning.

### **CILS Update**

CILS is a partnership of the Exploratorium, King's College London, and UC Santa Cruz. There are three programmatic components to CILS: (1) development of

effective practices and programs that bridge schools and ISIs; (2) development of educational leaders (through graduate, postgraduate, and professional development programs) who deeply understand issues of informal learning, systems, and program design; and (3) development of new knowledge in this domain.

CILS has enrolled 15 doctoral students and 7 postdoctoral Fellows. In its Informal Learning Certificate program, it has enrolled more than 50 museum-based teacher educators, from about 30 ISIs from around the country and 2 from abroad. All of these programs are fully paid by CILS—fellowships, tuition, and travel.

We continue to work on a research framework, which is an evolving document. At this point we are clustering our questions around three themes which I will discuss briefly just to introduce you to some of the terms you may hear in the next three presentations. The three general themes we are examining are: explanation, participation, and learning design.

Briefly, and in the kind of layman's parlance that I can understand, **Participation** has to do with relationships between learners, between learners and teachers, between learners and the subject matter. There are issues of authority involved. In a typical K12 classroom, the participation is structured in very clear ways: the teacher dispenses the knowledge. The students regurgitate it to the teacher. In progressive classrooms, oftentimes the teacher participates more as a facilitator of learning, and students participate in ways where they can teach and learn from one another, at least more so than the traditional classroom. Learning in museums, whether in informal encounters with exhibits, or in more formalized teaching programs, often shifts the participation structures so that the learner has more authority in the learning. Barbara's presentation will discuss ideas of participation.

**Explanation** is another theme. It has to do with the way in which science is discussed, presented, and conveyed. What is conveyed, how, and why. It also has to do with how we represent knowledge. We present ideas by physically instantiating them or illuminating them through exhibits. We also create environments and designed experiences that may enable different types of conversation and explanation to occur among various social groups: families, peers, strangers. Jonathan's talk will address what we choose to explain, and how, and the kinds of knowledge and understanding about science this promotes and what this means in our current cultural and political landscape.

Finally, the theme of **Learning Design** examines the types of experiences, resources, and strategies employed by ISIs to motivate and engage learners. We are seeking deeper understandings about the contexts, conditions and mechanisms for mediating science learning in productive ways and designing effective interventions. Mark's discussion will look at how a teacher development program at the Exploratorium effectively supported changes in teacher classroom practice, and consider the organizational and systems implications of the work our field does with respect to formal ed.

### **Close**

Two final points: one is that the three talks you will hear are about three different things. This is not a session that presents three different cuts at one thing. But they are representative of the types of things CILS is looking at. At the end our discussant will pull out the strands that connect them. We want to share with the community the questions and issues we are thinking about, hopefully to engage you and pull you into the discussion.

Lastly, this session was advertised to have small group discussions, but we were not able to get the 3 hr session we requested in order to do that. So instead we are going to take 5 minutes of clarifying questions after each presentation, and then save 15-20 minutes for the end for general discussion. I tried to get this changed in the program, but was too late to do that.

# **Center for Informal Learning and Schools:**

## **Current Research**

# **CILS is examining**

- The nature of informal learning
- Learning in “informal” institutions
- How informal and formal systems of education can most effectively align and connect to support K12 student science learning

# **CILS Programmatic Components**

- Development of effective practices and programs that bridge schools and ISIs
- Development of educational leaders (through graduate, postgraduate, PD) who deeply understand issues of informal learning from a research, systems, and design perspectives
- Development of new knowledge/research

# **CILS Research Themes**

- **Participation**
- **Explanation**
- **Learning Design**