

Policy Statement of the “Informal Science Education” Ad Hoc Committee

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In the spring of 1999, the Board of the National Association of Research in Science Teaching (NARST) established an Informal Science Education Ad Hoc committee, co-chaired by Lynn Dierking and John Falk. The Committee’s task was to focus on the organization’s positioning in regard to out-of-school science education.

After 2 years of work, the committee composed a policy statement, included below, that was presented to, and accepted by, the NARST Board. The policy statement defines this arena of research, describes a variety of out-of-school environments in which science learning occurs, identifies issues related to conducting research in this area, and makes recommendations for building a community of researchers in this field and for facilitating opportunities for collaborative initiatives with other research areas in NARST.

Policy Statement

Defining the Domain

Informal science learning is the most commonly applied term for the science learning that occurs outside the traditional, formal schooling realm (precollege, university, and advanced degrees). Although widely used, the term has significant limitations because it artificially delimits efforts to describe the type of real-world learning that humans engage in daily: learning that occurs across a broad spatial and temporal context, both inside and outside of schooling. As a growing number of researchers choose to try to understand how people come to learn about science, it has become increasingly apparent that such understanding must include more than just the experiences of schooling.

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At the core of this effort to understand real-world science learning is a firm belief that learning rarely if ever occurs and develops from a single experience. Rather, learning in general, and science learning in particular, is cumulative, emerging over time through myriad human experiences, including but not limited to experiences in museums and schools; while watching television, reading newspapers and books, conversing with friends and family; and increasingly frequently, through interactions with the Internet. The experiences children and adults have in these various situations dynamically interact to influence the ways individuals construct scientific knowledge, attitudes, behaviors, and understanding. In this view, learning is an organic, dynamic, never-ending, and holistic phenomenon of constructing personal meaning. This broad view of learning recognizes that much of what people come to know about the world, including the world of science content and process, derives from real-world experiences within a diversity of appropriate physical and social contexts, motivated by an intrinsic desire to learn.

Historically much of the research on science learning outside of school has occurred within museum-like settings. Learning from museums or other comparable educational institutions (zoos, aquariums, nature centers, etc.) actually represents a nominal number of the situations in which this type of learning occurs. However, the growing body of research on learning in and from museum-like settings provides an important baseline of understanding about learning in such free-choice situations. Clearly lacking, though, are comparable studies of learning from film, radio, community-based organizations such as scouts, summer camps, home, friends, the workplace, the Internet, and a whole range of other real-world situations.

As the desire to investigate learning in these settings increases, the need for an enhanced theory of real-world, lifelong learning becomes critical. The conceptual and methodological challenges engendered by this type of research have only begun to be understood. NARST has an opportunity to have a significant role in fostering and advancing research into the long-term, cumulative nature of science learning which is strongly socioculturally mediated and occurs across a wide range of physical contexts beyond schooling. The result will be a more holistic, large-scale understanding of the entire learning process, both inside and outside of schooling environments.

Implicit in this thinking is a discussion of an appropriate moniker for this area of research. There are many possibilities (e.g., out-of-school, free-choice or lifelong science learning, public understanding of science) but there was unanimous agreement among members of the Ad Hoc Committee that it should not be the current term: "Informal Science Education." The Ad Hoc Committee is still considering the appropriate one; however, they do know that it needs to reflect the following: learning that is self-motivated, voluntary, and guided by the learner's needs and interests, learning that is engaged in throughout his or her life (Informal Learning Environments Newsletter, May/June, 1998; Falk, 1999, 2001; Falk & Dierking, 2002). This is a discussion going on elsewhere in the field; in 1998 the journal *Science Education* initiated a permanent special section on Informal Science Education, owing in great part to the success of a special issue devoted to that topic in 1997, Volume 81(6). The name of that section was recently changed to Science Learning in Everyday Life and there has also been discussion about changing the name of Strand 9.

In the past 5–10 years, interest in this area of research has grown tremendously. The American Educational Research Association now has an Informal Learning Environments Research Special Interest Group with a biyearly newsletter, the journal *Science Education* has a permanent special section devoted to this topic, and the National Science Teachers Association has published a policy statement on this type of learning, created a board position, and recently published a two-volume book on the topic. NARST has participated in this trend by establishing Strand 9, supporting the joint AERA/NARST session at the Year 2000 annual meeting and by publishing a special issue devoted to the topic in the *Journal for Research in Science Teaching*. These are all important

efforts; however, it is the Ad Hoc Committee's belief that the NARST organization could be playing a leadership role and doing more to support scholarship in this arena.

Issues Related to Conducting Research in This Domain

In the past decade, research in the social and natural sciences has demonstrated that learning is strongly influenced by prior knowledge and experience, interest, and motivations, all shaping the expectations that people have for a learning experience. Learning is also a cumulative process—it can take days, weeks, or even months for new experiences to be sufficiently integrated with prior knowledge before learning is measurable let alone noticeable even to the learner. New data also suggest that most learning has more to do with consolidation and reinforcement of previously understood ideas than with the creation of totally new knowledge structures. Neuroscience research also demonstrates the importance of motivation, interest, and emotion in the learning process itself, suggesting that when people are interested and curious about something, there is a high possibility that they will follow up on that feeling with action, resulting in meaningful learning.

To frame research to investigate such meaningful learning these aspects need to be considered:

1. Such learning is self-motivated, voluntary, and guided by learners' needs and interests, so certain aspects of learning are critical to investigate (e.g., the role of motivation, choice and control, interest, and expectations in the learning process).
2. The physical setting in which such learning takes place is extremely important, so this learning needs to be investigated in authentic contexts.
3. Such learning is strongly socioculturally mediated, so research designs need to offer opportunities to explore social and cultural mediating factors including the role of conversations, social learning networks, cultural dimensions and the use of groups, as well as individuals, as the unit of analysis.
4. Learning is a cumulative process involving connections and reinforcement among the variety of learning experiences people encounter in their lives: at home, during schooling, and out in the community and workplace. Research designs need to offer opportunities to investigate all dimensions of learning and their connections in a variety of settings across a span of time which will allow us to understand how these experiences are used and connected to subsequent experiences longitudinally.
5. Learning is both a process and a product, so we need to investigate the processes of learning as well as the products of learning.
6. The very nature of such learning requires multiple, creative methods for assessing it in a variety of ways under a variety of circumstances. Thus, innovative research designs, methods, and analyses are critical (e.g., conversation/discourse analysis, constructivist tools such as concept mapping and personal meaning mapping, social learning network analysis, and hierarchical linear modeling).

The National Association of Research in Science Teaching has a potential opportunity to take a leadership role by supporting research in this area of out-of-school learning and raising its profile. In this way, the committee feels, NARST would demonstrate its understanding of the fundamental role such learning has in the lives of children and adults. By promoting a broader definition and framework for this type of learning and efforts to investigate its relationship to learning from schooling and workplace environments, NARST has an opportunity to shape a larger vision for the 21st-Century learner that includes out-of-school (free-choice) learning and reflects a holistic understanding of the entire science learning process across the life span.

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