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Social learning within a community of practice: Investigating interactions about evaluation among zoo education professionals

Kathayoon Khalil[a,b,d,*], Nicole M. Ardoin[a,b,c], Deborah Wojcik[e]

[a] Stanford Graduate School of Education, 485 Lasuen Mall, Stanford, CA, 94305, USA
[b] Stanford Woods Institute for the Environment, 473 Via Ortega, Stanford, CA, 94305, USA
[c] Emmett Interdisciplinary Program in Environment and Resources, Stanford School of Earth Sciences, 473 Via Ortega, Stanford, CA, 94305, USA
[d] Seattle Aquarium, 1483 Alaskan Way, Seattle, WA, 98101, USA
[e] Duke Nicholas School of the Environment, at 9 Circuit Drive, Durham, NC 27708, USA

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ABSTRACT

The accessibility and ubiquity of zoos and aquariums—which reach over 700 million people worldwide annually—make them critical sites for science and environmental learning. Through educational offerings, these sites can generate excitement and curiosity about nature and motivate stewardship behavior, but only if their programs are high quality and meet the needs of their audiences. Evaluation is, therefore, critical: knowing what works, for whom, and under what conditions must be central to these organizations. Yet, many zoo and aquarium educators find evaluation to be daunting, and they are challenged to implement evaluations and/or use the findings iteratively in program development and improvement. This article examines how zoo education professionals engage with one another in a learning community related to evaluation. We use a communities of practice lens and social network analysis to understand the structure of this networked learning community, considering changes over time. Our findings suggest that individuals' roles in a networked learning community are influenced by factors such as communicative convenience and one's perceptions of others' evaluation expertise, which also contribute to forming and sustaining professional relationships. This study illuminates how project-based professional networks can become communities of practice.

1. Introduction

Zoos and aquariums represent some of the most ubiquitous, democratic, and, therefore, critical sites of science education (Falk & Dierking, 2010; Falk, Heimlich & Foutz, 2009); each year they reach over 700 million people (WAZA, 2012) with messages related to biodiversity, environmental conservation, and science practices and processes (Patrick, Matthews, Ayers & Tunnicliffe, 2007). The outcomes of zoo and aquarium education vary, as do the quality of programming and interpretation, but one thing is certain: the emotional connection that people make through direct contact with live animals, coupled with the powerful learning that can take place in these institutions, has the potential for creating a lasting impact.

In North America, the Association of Zoos and Aquariums (AZA) accredits 225 zoos and aquariums, which serve over 175 million people annually (AZA, 2014). Zoos and aquariums undertake educational programming to achieve desired outcomes among visitors (Churchman, 1987). These outcomes may include increases in environmental, conservation, and science knowledge or positive attitudes, and/or pro-environmental behaviors toward wildlife and the environment (Fraser & Wharton, 2007); as such, evaluation in zoos typically centers on these topics (Falk, 2005; Falk, Reinhard, Vernon, Bronnenkant, Heimlich, & Deans, 2007). Well-developed, consistently implemented evaluations can offer insights into effective practices and maximize educational impact through tailored programming (Shadish, Cook, & Leviton, 1991).

Yet evaluation can be a daunting task for informal science and environmental educators due to its complexity and potentially time-intensive nature (Carleton-Hug & Hug, 2010). Although

Abbreviations: AZA, Association of Zoos and Aquariums; CoP, community of practice; SNA, social network analysis; MEERA, My Environmental Education Evaluation Resource Assistant.

* Corresponding author. Present address: 1483 Alaskan Way, Seattle, WA, 98101, USA.
E-mail addresses: k.khalil@seattleaquarium.org (K. Khalil), nmardoin@stanford.edu (N.M. Ardoin), deb.wojcik@duke.edu (D. Wojcik).

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numerous resources and supports are available (e.g., MEERA, Informal Science),[1] the process by which evaluation data are created, disseminated, and used can be overwhelming for educators, particularly if undertaken in a vacuum. This study addresses the potential benefits and challenges of addressing evaluation within a professional network and uses a social learning theoretical lens to explore how to improve collaborative practices within a community of evaluation practitioners comprised of approximately 11 lead seasonal educators in a ZooCamp program serving pre-kindergarten through eighth grade students.

1.1. Social learning

Social learning theory encompasses a wide-ranging body of work (e.g., Argyris & Schön, 1978; Bandura, 1977; Lave & Wenger, 1991) that considers social circumstances and recognizes the role of contextual norms and influences in learning, along with the adoption of new behaviors. We use social learning to refer to the collective enterprise of learning among a group of individuals through social interaction, virtual experiences involving observation, and active conversation that affects the creation of new ideas (Newig, Günther, & Pahl-Wostl, 2010). Outcomes of social learning include changes in understanding that may translate to the adoption of common goals, gained trust, or changes in attitudes or behavior. Social learning effects may be initially examined in individuals (i.e., how much the social context influences an individual's learning), but can also contribute to changes that affect the larger group or community (Reed et al., 2010) through the development of relationships, ethics, and agendas built on learning goals (Keen, Brown, & Dyball, 2005).

1.2. Communities of practice

Several frameworks build on social learning concepts; the community of practice (CoP) framework is one such application. Defined as groups of individuals organized around a common task or goal, CoPs may facilitate resource and information-sharing within social contexts (Lave & Wenger, 1991; Snyder & Wenger, 2010), and, thus, may offer a useful framework for studying the dynamic nature of social learning. Social learning in a CoP occurs through experience and participation in a social activity (Lave, 1993), involves connections between learners working toward a common goal (Barab, 1999), and requires accepting a learning agenda that establishes commitment among community members (Wenger & Snyder, 2000).

CoPs offer an especially interesting approach to studying social learning by accounting for the involvement of individuals with a variety of experience levels, from newcomer to veteran (Wenger, 2000). Novice group members can gain experience and become established members of the CoP through "legitimate peripheral participation" (Lave & Wenger, 1991; pp. 29) and may move from the edges, or periphery, of the CoP closer to the core. Core members tend to be more connected to other community members and have more control over the information that passes through the CoP (Wenger, 1998); thus, it can be helpful to observe how interactions among diversely experienced individuals influence the structure of the CoP and the participation of members. Wenger (1998, pp. 125–6) offers 14 indicators that, if satisfied, suggest the existence of a CoP:

1. Sustained mutual relationships (harmonious or conflictual)
2. Shared ways of engaging in doing things together
3. The rapid flow of propagation and flow of innovation
4. Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process
5. Very quick set-up of a problem to be discussed
6. Substantial overlap in participants' descriptions of who belongs
7. Knowing what others know, what they can do, and how they can contribute to an enterprise
8. Mutually defining identities
9. The ability to assess the appropriateness of actions and products
10. Specific tools, representations, and other artifacts
11. Local lore, shared stories, inside jokes, and knowing laughter
12. Jargons and shortcuts to communication, as well as the ease of producing new ones
13. Certain styles recognized as displaying membership
14. A shared discourse reflecting a certain perspective on the world

Community members' roles, as well as the community structure, can shift over time as the CoP adapts to changing circumstances (Johnson, 2001). Wick (2000) posits that a CoP can rapidly develop and evolve to address a task or accomplish goals. Additionally, better understanding how CoPs change over time can facilitate development of structures and processes that better support social learning within these groups over their lifespan.

1.3. Social network analysis

Social network analysis (SNA) provides a means of understanding the exchange of resources among actors in a system (Wasserman & Faust, 1994). SNA allows researchers to analyze connections and characteristics of a group by considering both attributes of actors and the relationships among those actors (Scott, 2000).

Because we sought to understand how social learning in a CoP evolved over the course of a summer, we conducted a longitudinal study, using data collected at discrete time points, while acknowledging that the evolution of the network may be gradual (Snijders, 2005). Prior research using longitudinal network analysis has tracked phenomena such as the spread of emotions within groups (Fowler & Christakis, 2008), professional alliance formation (Gulati, 1995), and friendship selection (Sijtsema et al., 2010).

SNA also has been applied to the analysis of project-based networks to better understand circumstances where a network develops around a fixed-duration project. Project-based networks have been studied in the fields of engineering and construction (e.g., Chinowsky & Taylor, 2012), biotechnology (e.g., Al-Laham & Amburgey, 2011), and art (e.g., Bettiol & Sedita, 2011) to understand the dynamics of relationships among group members, as well as the knowledge and resources exchanged through the completion of the project (Chinowsky, Diekmann, & O'Brien, 2010). Network analyses of project teams can provide important information on systems in which hierarchy is unclear, project length is fixed, and relationships are developed within a clearly bounded network (Pryke, 2004).

The main focus of this study was the qualitative analysis of group dynamics based on the CoP framework; SNA provided valuable support for these qualitative findings. The small number of actors in this study limited the network measures that could be calculated. We therefore used SNA to collect basic information about the evolution of relationships over time and corroborate the qualitative data gathered through interviews and a focus group. Using SNA in this way, we hope to offer this as a potential technique for future research in similar areas.

[1] MEERA can be found at http://meera.snre.umich.edu; Informal Science can be accessed at http://www.informalscience.org.