Environmental Learning Through the Lens of Affinity Spaces: Transforming Community Members Into a Community Force

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Abstract: In this paper we use affinity spaces as a lens to understand how adult community-based learning happens in an environmental education program. Participants take a series of classes and undertake guided experiential activities related to watershed issues and then carry out capstone projects in their own communities that address stormwater management issues. Within the context of the Watershed Stewards Academy, we aim to understand how participants bring diverse perspectives and experiences, interact with one another, and engage in environmental learning and action. Our analysis traces learners' development from becoming aware of the importance of stormwater management to the watershed's health to taking leadership roles in their communities. Our findings point to the potential of new face-to-face strategies and technology that can aid learners in interacting and learning together.

Keywords: informal learning, environmental education, adult learning, affinity spaces, technology

Introduction

Learning about the environment has become increasingly important for addressing society's most pressing issues of the 21st century—including energy consumption, climate change, and water pollution—particularly because many people are largely uninformed about the scientific processes underlying environmental phenomena and actions that could be taken to address problems. For example, Robelia & Murphy (2012) found that in a national survey, 59% of respondents could not accurately describe a watershed, and they did not know that various practices within watersheds contribute to water pollution or that preserving wetlands reduces runoff and thus improves water quality.

We draw upon affinity spaces as a lens to understand how adult learning happens within a mid-Atlantic Watershed Stewards Academy (WSA), one of a network of stewardship programs focused on training citizens to serve as community resources on local watershed issues and solutions. The WSA includes classes, experiential learning, and capstone projects that address some aspect of stormwater management and includes a community education component. We aim to understand how participants with diverse perspectives and experiences interact with one another as they engage in environmental learning and action through the WSA. Developing a nuanced perspective of how learning happens within this context informs our broader understanding of how to design and support adult community-based environmental learning through face-to-face strategies and technology as appropriate.

Aspects of environmental learning

Environmental studies researchers have pointed to three key aspects of environmental learning. First, and most obvious, is content knowledge, which includes understanding the scientific phenomena behind an environmental issue (e.g., the cycle of rainwater washing pollutants from parking lots, drains, and sidewalks into rivers, streams, and bays) (Robelia & Murphy, 2012; Walter, 2009) and what actions to take. Second, Clover (2002, 2013) advocates for learners to move beyond emphasizing content knowledge and individual action to develop critical reflection skills so that they can evaluate macro-level issues and policies that affect the environment. Ignoring the larger issues that form the core of local, state, national, and international policy decisions can have profoundly detrimental impacts. For example, Clover (2002) describes a neighborhood movement to recycle in which, unbeknownst to the community, the city was dumping its recycling out with the regular trash to cut down on costs, thus pointing out that individual actions alone may not be enough to create change. Clover (2002) calls this type of understanding "*concientización*". The third aspect of environmental learning involves expanding from individual actions to systemic community-wide endeavors that stem from a deep understanding of the impact of policy and infrastructure on the environment. These actions often require a collective effort by people from diverse backgrounds (Clover, 2013).

While these characterizations of different learning approaches provide useful overviews, they are often not explicit about how learning happens and how we might best promote it. For example, they do not focus on

community-driven learning among adults, the topic of this study. To fill these gaps, we turn to affinity spaces as a lens for gaining a deeper understanding of learning within the context of the WSA, and for exploring the kinds of scaffolding –human and technical – that might help the WSA and similar adult learning communities.

Affinity spaces: A lens for examining environmental learning among adults

Gee (2005) uses the term *affinity spaces* to describe locations in the real or virtual world in which people interact around a common passion or interest with others who have different expertise and who take on different roles, sharing their knowledge, tools, and technologies. Example studies have typically included gaming communities and enthusiast clubs (e.g., Star Wars online fan groups) – spaces that are usually informal learning contexts where interaction occurs virtually or in physical environments, and often both. These affinity spaces offer opportunities for community members to engage in science deeply connected to their interests and values, and they provide low-risk opportunities for them to explore potential roles they might take in science, especially when the science is directly relevant to their own lives (Clegg et al., 2014). Gee (2015) describes how affinity spaces consist of a *rich problem solving context* and *interest-driven sites.* This framework is particularly well-suited for understanding learning in the WSA in which *a rich problem-solving context* entails learning how to solve a watershed problem and culminates in a capstone project; the *interest-driven site* is the WSA program and the local community in which learning occurs. Gee advocates that the two should be studied as a unit because participants' experiences are integrally developed as they navigate both. During this development, there is often a rich interplay of diverse ideas as community members make suggestions influenced by their own experiences. We concur with this suggestion, which we believe applies to adult learners in the WSA context.

Gee proposes three types of diversity that may facilitate sustained learning experiences for participants. First, affinity spaces should bring together people with different orientations to, and expertise in, the domain of interest. Second, affinity spaces need to promote diverse modes of engagement among participants. Third, distinct roles and multiple ways of contributing support the need for diverse ways of learning. Therefore, in order to apply Gee's theory of affinity spaces to our AWS context we need to understand the ways participants interact within these spaces and how their roles come together to support learning. This understanding is important for informing how we might design learning environments and associated tools (e.g., technologies) to systematically support classes and community-driven environmental projects that facilitate adult learning.

Study context: Watershed Stewards Academy

The Watershed Stewards Academy (WSA) is a volunteer training program designed to equip individuals with the resources, tools, and knowledge to serve as leaders in their communities on watershed issues. Stewards participate in a 12-session course, and then have up to a year to develop and complete a capstone project in their own communities that has to do with stormwater management and community education. Upon course and project completion, they become Master Watershed Stewards. According to a 2014 survey, those who participate in WSAs in this mid-Atlantic state tend to be predominantly female (64% female; 36% male), white (78% white; 22% non-white), highly educated (89% reported at least a college degree), and older (mean age of 51.5 and median age of 53.5) (Fisher, Yagatich, & Galli, 2015). The WSA studied is working to increase diversity among participants by partnering with local faith-based organizations and expanding outreach efforts.

Methods

In a 4-month period between June and September 2015, we conducted 4 individual interviews and two focus groups with a total of 15 past and current WSA participants, who were at different stages in the WSA course. Some participants were beginning their classes, others were starting their capstone projects, and some had completed their projects. The first focus group was conducted as part of a WSA class with seven stewards; the second was a special session with four past WSA participants. Questions for the focus groups addressed motivation for joining the class, capstone projects, and the use of technology to accomplish their project goals. Additionally, two researchers observed the capstone project proposal presentations of a cohort of stewards at the end of their 12-week class and recorded field notes. One of the researchers was also a participant in the class.

Data analysis

Three researchers collaboratively developed a codebook consisting of 17 codes based on the conceptual framework and the concepts discussed in the interviews and reports of observations, paying special attention to participants' descriptions of aspects of the WSA program, such as the 12-week class experience, ideating capstone projects, collaborating on projects, and use of technology. Codes were also developed for tracing participants' learning experiences (i.e., learning developments) and instances of steward collaboration. Data was analyzed in a

deductive process and using the simultaneous coding system on Dedoose, a qualitative analysis software tool. Two researchers coded subsets of the focus groups and interviews using the codebook. Analytic memos were used throughout the coding process. Tables were applied to codes to illustrate overlapping ideas in order to capture the full learning experience and the development of participants' learning. In this way we could infer the learner's experience from the data (Miles et al., 2013). A third researcher then conducted a second coding pass across the data to inductively develop patterns within the codes for learning developments, steward collaboration, and challenges stewards faced.

Findings: How learning happens

Developing Awareness and Understanding in the 12-Week Class. The patterns we observed from the data suggest that during the 12 weeks of class, participants became aware of the impact of stormwater pollution on the environment. They also began to consider community and policy issues as they learned to assess stormwater management practices, toured green sites and interacted with their WSA facilitator and other stewards, which they began to take to their own homes, neighborhoods, and work places. For example, Ian[1] described doing site audits in the program: "*It was really low tech … we went around to houses, and that really gave you a perspective of how little people think about water issues around their home*" (focus group 2). Another participant said: "*I didn't know that half of the water in our [religious facility] is not being treated before it hits the river. And I had no idea that we are dumping about 12 million gallons of water into the river every year*" (interview).

Fueling Passion with Capstone Project Work. These inquiries into their own contexts fueled participants' ideas for their capstone projects as many chose projects rooted in their own interests, neighborhoods, and professions. For example, Liz chose to focus her capstone project on the religious facility that she managed. As participants began to implement their projects, they reported common learning needs, e.g., to understand effective ways to manage stormwater (e.g., rain barrels, rain gardens), ways to build and create management systems (e.g., what types of plants to put in a rain garden) and how to handle problems that arise.

Becoming a Community Force. As participants carried out their projects, they reported taking on more leadership roles in their communities and changing how they viewed themselves and the local river. For example, Barbara reported that she began to educate her father about runoff principles and encouraged him to question his practices. Pattie discussed the importance of engaging in larger scale projects for increased impact: "*I think a really, really big benefit to the [WSA] program would be to connect with either the county planning boards or even the state planning boards*" (interview). Another steward suggested scaling up capstone project efforts through *"mega projects"* that integrated multiple capstone projects (focus group 2).

As stewards carried out their projects, they reported running into many challenges, including working with large communities, developing connections with the community, motivating community members to take continued action required for the upkeep of completed projects, dealing with changes in community leadership, and understanding the competing priorities of community members. Other kinds of challenges included scoping their capstone ideas into feasible projects, needing to invest significant time and energy to complete projects, obtaining funding for materials associated with their projects, and accessing appropriate technology for conducting site audits and recording other data. One interesting theme that emerged from our data was the stewards' dynamic interactions with each other. This theme may tell us more about creating "interest-driven sites" for supporting learners in this affinity space, such as by facilitating discussion of ways to address their challenges through leveraging their own social capital, culture, expertise, and past experiences.

Discussion, conclusions, and implications

Our analysis reveals stewards' progression from first developing awareness and understanding of stormwater issues in the 12 weeks of classes, to then becoming passionate about stormwater management as a result of their capstone projects, and (for some) ultimately becoming community leaders through their continued efforts. This progression suggests that community-driven environmental projects are a context in which learners can begin to develop *concientización* (Clover, 2002, 2013) in which they begin to progress from individual action and awareness to broader community action and leadership. Though some were able to make this leap, they expressed a desire for more support such as help with linking to additional learning resources and opportunities. These findings support Gee's call for problem solving within interest-driven sites (Gee, 2015).

Considering the challenges and interactions stewards faced from an affinity spaces perspective suggests that stewards of community-driven environmental projected may benefit from more diverse "interest-driven sites," specifically online spaces, social media, and other types of technology (Lammers et al., 2012; Gee, 2015). Of the 120 past and current WSA participants we invited to meet with us, only 11 were able to attend the face-to-face events. Online forums may thus offer additional opportunities for collaboration and engagement that fit within the contexts of their busy lives. Such interest-driven sites are spaces in which learners can articulate and

organize their knowledge, interact around a problem-solving context to develop new possibilities for solving problems, mentor and learn from one another, and specialize in specific aspects of the context (Gee, 2015). Our analysis suggests that interest-driven sites for community-driven environmental projects need to support stewards at two levels: first, for *awareness and understanding* of stormwater management principles and practices; and second, for *communication and interaction*, particularly during their capstone projects as they engage with their communities. Integrating face-to-face and online support for these conversations would enable diverse modes of participating over time as called for by affinity spaces researchers (Lammers, et al., 2012). The kinds of tools that are needed in interest-driven sites include project management, communications, and mapping tools, which will most likely be technological in nature.

Drawing on an affinity spaces perspective, we conclude that a framework that extends beyond traditional teaching perspectives is needed in this context. A framework that emphasizes prompting, supporting, and sustaining learner-driven environmental experiences would extend those already offered (e.g., by Clover, 2002, 2013; Walter, 2009), by highlighting the importance of helping learners find the right learning experiences and resources (e.g., funding sources, lectures, hands-on experiences) at opportune times to support and empower them in their own local and larger-scale contexts. This approach must balance the structure needed to promote learning with freedom for learners to direct their own learning so that they develop their own personal value for the environmental contexts in which they are working. We advocate for a framework that takes a variety of perspectives and that helps learners to link to new learning opportunities and to take on leadership roles in their own local and global environmental contexts. More work is needed to develop such a framework and to understand how interest-driven sites, especially those that provide rich technology support, can be integrated with face-to-face experiences in this and similar contexts to support learning, empowerment, and leadership in community-driven environmental projects.

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