Digital Environmental Storytelling Connecting to the Arctic: #60Above60 Pilot

Laura C. Engel, Mary E. Short, Sarah E. Jennings, Robert W. Orttung & Luis J. Suter

This paper discusses educator/research experiences as participants in a National Science Foundation (NSF) funded project taking place within the larger research endeavor Partnerships for International Research and Education (PIRE): Promoting Urban Sustainability in the Arctic. Arctic PIRE is based in Washington, DC and operates in collaboration with 13 universities from around the world. As central to the educational outreach strategy of the project, this chapter focuses on the design of an environmental digital storytelling pilot project, called #60above60. The major component of #60above60 involves the digital exchanges of teacher and student-led 60-second videos between classrooms in the DC metropolitan area and Arctic urban communities. Through these exchanges, the aim is for students to share urban life perspectives across the 60-degree parallel, which is how this project defines "Arctic". This interdisciplinary project's goal is to connect students from Arctic and non-Arctic communities to examine both local and global environmental challenges, as well as potential solutions. In this chapter, utilizing perspectives in the literature focused on developing global competencies, environmental literacies, and student voices and agencies, we provide a reflection on the design of the #60above60 project.

Introduction

How do we address the considerable disconnect between scientific research and public knowledge? How, through our various positionalities, is science shared with the public? Who can be an expert in creating and sharing knowledge about environmental-based problems and solutions? How do we engage the next generations in explorations of sustainability both at home in a local context and places far removed? These questions speak to the core challenges facing research, teaching, and learning about the Arctic. Well-noted in debates about scientific communication, it is increasingly difficult to communicate and disseminate dynamic and complex scientific knowledge with an increasingly skeptical public (Bubela et al., 2009). Of equal importance, particularly as it relates to the Arctic, is the need to engage practitioners and students in scientific inquiry and to involve the youngest generations in understanding and addressing ecological challenges facing their local, national, global, and planetary communities (Gold et al., 2015; Misiaszek, 2015, 2016).

Laura C. Engel & Sarah E. Jennings are from the International Education Program, Mary E. Short is from Curriculum and Instruction, Robert W. Orttung is from the Sustainability Collaborative, and Luis J. Suter is from the Department of Geography, at The George Washington University, Washington D.C., USA.

This chapter offers a reflection on the educational research and outreach components of the National Science Foundation (NSF) Arctic Partnerships for International Research and Education (PIRE), Promoting Urban Sustainability in the Arctic. We focus specifically on the recently launched #60above60 pilot project, which aims to connect students and classrooms in Arctic and non-Arctic urban contexts. This paper features program design, rather than program outcomes, in order to reflect on the initial pilot design of #60above60 utilizing perspectives from the literature on global competencies, environmental pedagogies, and the advancement of student agencies.

Teaching & Learning about the Arctic

There are many examples of educational outreach programs and organizations aimed at enhancing teaching and learning about the Arctic, frequently positioned as a vital locale for advancing future generations' understandings of the effects of climate change. Often Arctic-based educational outreach efforts focus on building knowledge and understanding about the Arctic through teacher professional development, the production and dissemination of curriculum and related materials, and the provision of opportunities for teacher study abroad. Although significant contributions have been made, many of these efforts have reached only limited populations of students and teachers.

The often-limited outreach of Arctic-based teaching and learning programs speaks to a broader challenge facing ecological educators, namely how to make explicit the connections between local communities and global environmental systems (Connell, Fien, Lee, Sykes & Yencken, 1999; Gold et al., 2014). This challenge is also well-recognized in global education, where scholars have argued against the tendency to advance "the global" as an abstract, bound object or place separated from a local community. Rather, global learning must seek ways to build knowledge, attitudes, and skills to help "students examine the ways in which global processes are creating conditions of economic and cultural exchange that are transforming our identities and communities" (Rizvi, 2009: 265-266).

Applying these ideas to Arctic-based teaching and learning in non-Arctic spaces, it is no longer adequate to study the Arctic as a geographical, cultural, or environmental space far away. It is instead important to advance the ways in which human beings, albeit with distinct positionalities, are inherently linked in global and planetary social and environmental configurations. As such, one way to teach and learn about the Arctic is to begin much closer to home through investigating students' own local contexts in connection with Arctic contexts. This idea lies at the heart of the literature in education aimed at advancing global competencies, environmental literacies, and student agencies, out of which the #60above60 project has emerged.

Advancing Global Competencies

Boix Mansilla and Jackson (2011) defined global competency as "the capacity and disposition to understand and act upon issues of global significance" (xiii). Some of the key dimensions include developing students' critical thinking and analytic skills about global problems and issues; attitudes of empathy, solidarity, and respect for difference and diversity; and the willingness to take action on global problems. Advancing global competencies in education seeks to develop student's capacity to (1) investigate the world (students investigate the world beyond their immediate environment), (2) recognize perspectives (students recognize their own and others'

perspectives), (3) communicate ideas (students communicate their ideas effectively with diverse audiences), and (4) take action (students translate their ideas and findings into appropriate actions to improve conditions). Emphasis is placed on action and solving problems of global significance, as well as building more a comprehensive understanding of multiple perspectives and worldviews, including their own as well as others, while taking action (Boix Mansilla & Jackson, 2011).

Yet, creating a program focused on developing global competencies through environmental pedagogies comes with some notable cautions. According to Misiaszek (2016), for example, well-meaning environmental educators have historically ignored socio-environmental connections to impose western developmental value systems on their international students in the name of sustainable development. Far too often, students participating in environmental education programs are taught that sustainability in the Arctic means treating it as a static object, somewhat of a museum. These messages often ignore Indigenous traditional practices, such as, for instance, hunting, and vilify practices and ways of knowing that have been passed on through generations. Many marginalized Arctic Indigenous communities are already struggling to hold on to their rights to these practices. Such an approach to environmental education is in its own right oppressive as it results in the further loss of traditional and cultural knowledges. Therefore, as Misiaszek (2016) argued, educational approaches aimed at building global competencies must be teamed with ecopedagogy, as both are necessary in order to remain conscious of socio-environmental ramifications inherent in environmental education.

Furthermore, global competency approaches, such as Boix Mansilla's (2016) global thinking routines, build global awareness through a reflective set of activities. In environmental education, these reflective practices can help learners consider multiple perspectives on issues from a range of cultural stances, and provide with students opportunities for learning about environmental issues through appropriate instructional practices (Scott, 2002). In doing so, learners come to understand the significance of their learning while continuing to think individually, as well as socially, about their actions (Qablan, Al-Ruz, Khasawneh & Al-Omari, 2009; Scott, 2002).

Environmental Literacies

Developing students' capacities for critically evaluating complex problems is essential if students are to be prepared to address global ecological problems such as climate change, renewable energy development, and resource management. Environmental pedagogies, such as education for sustainability, education for sustainable development, environmental education, and ecopedagogy all have common threads in defining the skills, knowledge and dispositions needed for developing literacies as focused on "increasing environmental wellbeing" (Misiaszek, 2016: 587). Researchers define environmentally literate populations as those whose members understand the guiding principles sustaining ecosystems and hold basic ecological knowledge (Orr, 1992; Sobel, 2008; Stone & Barlow, 2005). Environmental pedagogies encourage the development of environmental literacies when they become embedded into education and equip students to create more sustainable communities (Orr, 1992; Stone & Barlow, 2005). When students see their communities as *one* aspect of human-made systems within our natural systems, they develop a wider foundation for environmental literacies (Gruenewald, 2003b). According to the North American Association for Environmental Education (NAAEE):

> An environmentally literate person, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the wellbeing of other individuals, societies, and the global environment; and participates in civic life (Hollweg et al., 2011: 2-3).

And the Maryland Association for Environmental and Outdoor Education (maeoe.org, n.d.) states:

> It is critical that today's students understand the ecological, economic, and cultural connections between humans and the environment and realize how decisions made by individuals (including themselves) and governments influence these areas and the connections among them. Environmental literacy is integral to fostering this understanding, emphasizing that humans are part of a global community and that actions and decisions made locally by individuals or communities have effects that go well beyond local environments ("Defining Environmental Literacy", n.d.: para 3).

By beginning close to students' daily life experiences and home community, and expanding outward, learning becomes conceptually achievable as lessons are scaffolded with the intention of making it possible for students to develop the skills necessary for asking and discussing critical questions about both local and global environmental human impacts. Central to global competency education, as well as environmental pedagogies, is the guiding principle that a leading purpose of education is to instill in students the capacity and motivation to act on their learning, rather than to remain passive recipients. This philosophy holds the belief that students and children are fully entitled to participate in discussions of global proportions and should be encouraged to advocate for changes which make their own lives, and the lives of those around them, more just.

Developing Student Agencies

To incorporate action into our framework, the project is informed by critical science education scholars. Evidenced in the literature, researchers have argued that students who are academically competent in the school subject matter view their experiences in science classrooms as irrelevant for their future careers and disconnected to their everyday lives (Carlone, Haun-Frank & Webb, 2011; Eisenhart, Finkel & Marion, 1996; Windschitl & Calabrese Barton, 2016). Scholars offer several reasons for this disconnect. For instance, scientific disciplines, as taught in many schools, reinforce ways of thinking, acting, and being that are reflective of masculinity, and western European cultural ideals (Brickhouse, Lowery & Schultz, 1999). Or, students find their situated discourses to be contradictory to those of academic scientific discourses and as a result learn through classroom talk that their science educational experiences are not personally relevant (Carlone et. al, 2011; Eisenhart, et. al, 1996; Windschitl & Calabrese Barton, 2016). This systematic messaging regarding scientific normative practices and identities creates a disconnect for the many students who fall beyond those narrow categories. Collectively, the central thrust of these studies is making science education meaningful to students' lives through connecting the objective of study in science with student's communities, whereby through learning about problems directly impacting those communities, students will be more likely to engage in civically minded scientific actions.

Ideas of the active learner are, of course, not new. These ideas, for example, are related to Dewey's (1916) notions of the active learner engaged in a process of creating knowledge (e.g., "doing") and later reflecting on that generated knowledge to build engagement in the learning

process. Taking a cultural studies approach to science education, Basu et. al (2009) developed a framework of socioculturally situated science education with a focus on civic action. Termed "critical science agency," Basu et. al build upon the works of Freire (1970) in that it maintains that learning *is* agency. Through the act of learning, an individual may begin to break down power structures and create a more just world.

Focusing on enhancing agencies of learners means taking a deep look at the ways that students learn, and the systemic structures within which students are taught, so that we may address materials and practices reinforcing the perception that nondominant student populations are missing or invisible in science (Barton & Tan, 2010; Basu et. al, 2009; Basu & Calabrese Barton, 2010). In doing so, Basu and Calabrese Barton (2009, 2010) acknowledged power structures existing within science education and, thus, their research demonstrates the benefits of instructional designs that address and mitigate power structures. As students learn through instructional practices that encourage a sense of academic agency, the process focuses attention on the powerful and subjective role of subject matter knowledge. Therefore, students are empowered to see themselves as capable of academic futures and extracurricular endeavors pursuant to creating a more just and equitable world (Arnold & Clarke, 2014; Barton & Tan, 2010; Basu et. al, 2009; Basu & Calabrese Barton, 2009; Basu & Calabrese Barton, 2010). As a result, students begin to use science as a context for change while developing a scientific identity (Basu & Calabrese Barton, 2009).

Weaving together these three sets of perspectives in fostering global competencies, environmental literacies, and student agencies, it is essential for Arctic-based teaching and learning to foster opportunities whereby students can investigate urban sustainability and environmental changes in their own local contexts, exchanging these ideas with students in Arctic contexts perhaps otherwise distant. Derived from these three sets of perspectives, such an exchange should be designed to provide students with experiences that broaden their conversations from the local to the planetary, a leap of paramount importance if students are to be prepared to address global concerns in their lifetimes.

#60above60: Making Space for Writing and Exchanging Environmental Stories

Inspired by advancing both global learning opportunities in local schools and place-based environmental pedagogies targeting local ecological environments of students (Gruenewald, 2003a), as well the notable gap in existing approaches to Arctic teaching and learning, the Arctic PIRE launched the #60above60 pilot program in 2016. #60above60 emerges out of the NSF Arctic PIRE, a cross-disciplinary and international collaboration among 13 universities around the world. The five year project (2016-2021) is aimed at developing metrics for Arctic urban sustainability, as well as advancing innovative ways to communicate this science with different stakeholders. These aims therefore include building connections between students in the Washington, DC metropolitan area and communities in the Arctic.
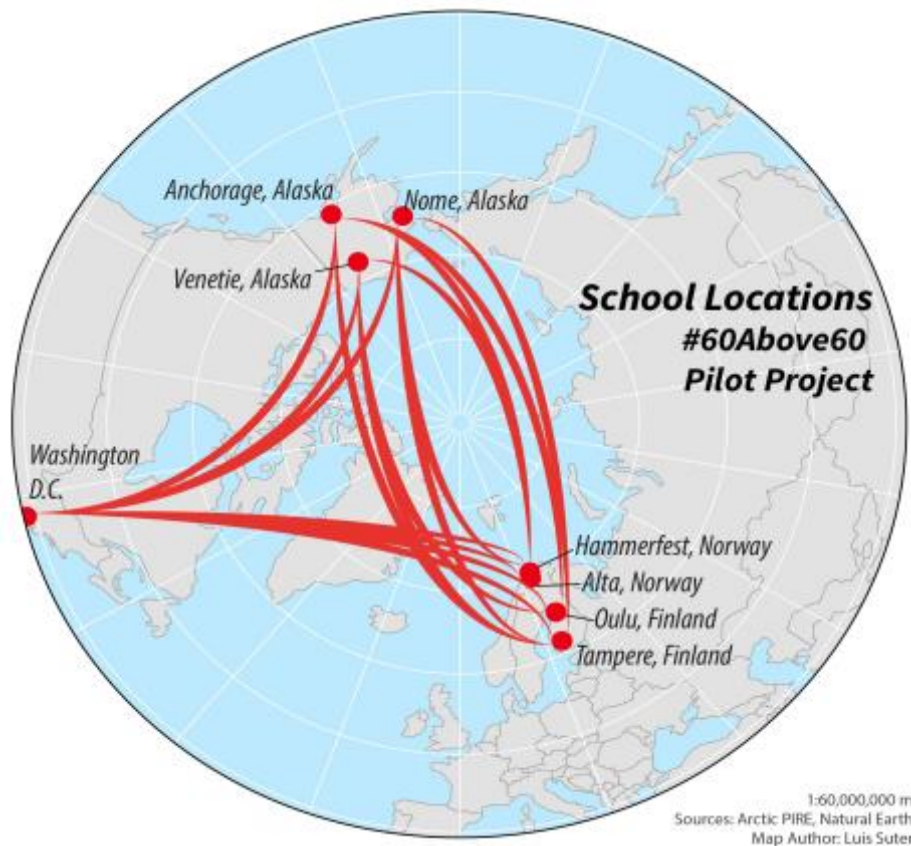
#60above60 refers to 60-second videos produced by primary and secondary age classrooms in non-Arctic (e.g., the DC metropolitan area) and Arctic urban communities in order to share perspectives on urban life from above and below the 60-degree parallel. The idea is based off of GW Planet Forward's "60-Second Selfie Challenge" that encourages college students to use

readily available mobile technology (e.g., their cell phones) to make 60-second videos of themselves exploring sustainable innovations related to food, water, energy, and climate on their campuses or in their communities (Planet Forward, 2014). The Planet Forward model is to "engage young people and innovators in search of solutions to the biggest challenges facing our planet" (Planet Forward, n.d.).

#60above60 adapted these ideas of digital environmental storytelling through investigating a student's own community as a central means to advancing experiential, problem-based global learning. The focus on the "selfie" (i.e., the self as the center of the story) was broadened to "video," in order to allow students to step behind the camera in the production of digital stories. For the youngest learners, classroom videos and photos were also encouraged. Additionally, one of #60above60's central components is not only the production of 60-second digital stories of environmental problems and solutions in urban contexts, but also the exchange of these videos with youth in other contexts, providing new opportunities to scaffold learning about communities and cities where students may have little or no previous knowledge. By prioritizing digital and environmental storytelling as a primary avenue, the aim of #60above60 is to engage students in cross-site and cross-national reflections on the social, historical, political, cultural, and environmental factors that shape urban sustainability in cities around the world.

In its initial launch, #60above60 did not have specific criteria on subject matter or grade level, operating with intent to encourage diversity of perspectives among teachers and learners. Consequently, participating classroom teachers taught a range of subjects and content including: media and technology, reading, general science, advanced placement (AP) environmental science, social studies, and general education (all subjects). Moreover, in the initial pilot phase, a range of elementary, middle and secondary classrooms participated, including five primary schools (age 8-12), three middle schools (age 13-16) and ten secondary level classrooms in total (age 16-19): (6) Washington, DC, United States, (4) Alaska, United States, (4) Norway, and (4) Finland who indicated an interest in participating in #60above60 in their respective classrooms (see Figure 1).

To initially connect with these schools and invite participation, we used a snowballing method, beginning with members of the Arctic PIRE research team to get in contact with school leaders or teachers. Considerations included access to technology and the production of videos in English. As such, it is important to consider that schools interested in the initial pilot phase of #60above60 were already connected with researchers in universities and often in environments with ready access to technology. Also notable are exclusions of schools both in Canada and Russia. In future iterations of #60above60, we plan to incorporate Russian and Canadian schools, as well as aim to include schools serving disadvantaged and/or more remote student populations. When teachers indicated an interest, a package of materials was disseminated to them, including an educational outreach infographic on the Arctic, sample videos, "how to" video production toolkits, and a #60above60 curricular framework, discussed further below. In addition, educators were connected with the project and one another via a password protected Wikispace where teachers could post and share their process of creating videos and photos, either individually or through classroom collaboration. Classrooms collaborated among age groups and across regions. In the discussion that follows, we detail the design of the three central lines of inquiry within the #60above60 project. In doing so, our aim is to be reflective of how and in what ways the program speaks to the guiding perspectives from literature in global competencies, environmental pedagogies, and advancement of student agencies.

Figure 1: School Locations for #60above60

Project Design: Three Lines of Inquiry

The framework of #60above60 includes three lines of inquiry that require increasingly complex thinking and investigation on the part of the student. Each line of inquiry is framed by a single place-based investigative question used as the basis for the digital story: (1) What is special about your city? (2) What is an environmental challenge? (3) What is a solution to that challenge? Each of the three questions acts as an individual stage. Whereas the videos are guided and students are prompted, the intent is that they will be driven by student interests in asking and answering questions about their local environments, leaving subject matter decisions up to them. Teachers support students in choosing topics for discussion, as well as in constructing their discussions around video subjects. The bulk of video content, however, is chosen, filmed, and discussed by students. Along with these three prompts, we provided examples of how to build global competency using this framework with visible global thinking routines (Boix Mansilla, 2016; Ritchhart, Church & Morrison, 2011). For example, they could be used for student evaluation, writing prompts, or to build research skills. The three prompts are discussed below.

What is special about your city?

The objective of this first line of inquiry is to introduce students to the process of investigating their cities independently and to become more comfortable as investigators. It is intended to help students see themselves as members of their local communities, and take ownership of their local environments. It situates students' educational investigations within a larger, nested cultural and

social system (Lemke, 2001). While we are not implying that this line of inquiry is capable of spanning the full range of students' sociocultural networks, it does encourage students and teachers to move investigations beyond school walls and into larger community contexts. For instance, in the design of this stage, this process offers students the opportunity to step into local spaces of the surrounding communities and begin to generate questions about what the special attributes might be and what makes them special. For non-Arctic students, this first line of inquiry provides new insights into urban Arctic life: What does an Arctic city look like? How might this exercise challenge assumptions about Arctic cities? Before reviewing videos from abroad, classrooms are asked to reflect on what they already believe about the other featured contexts, as well as what they do not know, and are curious to learn. They are asked to consider assumptions implicit in their notions, questions, and beliefs about their exchange city and then to conduct independent research about what life is like there. Overall, the first line of questioning is aimed at structuring students' investigations about home and abroad.

What is an environmental challenge?

During the second line of questioning, students identify environmental challenges facing their local communities to facilitate the examination and questioning of urban sustainability issues within their local environments. Students are asked to consider what caused the problem, and what difference it makes in the lives of people who live there. Students are also encouraged to consider: Who is affected? Why does the environmental challenge matter to their communities? They are then asked to consider: What environmental challenges might be taking place in the city with which they exchange videos? The intention is then for students to compare and/or contrast those challenges to environmental challenges depicted in the student videos from other cities. By discussing what they learned about environmental challenges in different parts of the world, the program design offers students an avenue to better conceptualize the ways in which people, regardless of distance, are connected as members of a greater global community.

What is a solution to that challenge?

The third stage of #60above60 encourages students to critique and support ways in which their local communities and peer cities are addressing environmental challenges. By taking a critical approach to local and global environmental challenges, students are encouraged to take action both locally and globally. During this phase of the project, students are asked to consider (among other questions): How would you address this environmental challenge? What difference does it make in the lives of people who live there? As students share their videos, they are able to consider the deeper socio-environmental factors embedded in the problems identified by their international peers. The lines of inquiry listed above are carefully worded to encourage students to not only think about human-nature interconnections and interactions, but to deepen those considerations to include multiple perspectives. Teachers are provided reflective prompts that may foster discussion around solutions from across the 60 degree parallel and how they may or may not be possible at home.

Discussion

In an effort to build additional platforms to advance meaningful global and environmental learning, the design of #60above60 is aimed at creating a virtual space whereby young people can pose critical questions about urban sustainability issues in their local communities and investigate

potential solutions to environmental problems. Layered onto this place-based pedagogical approach are opportunities for non-Arctic students to engage in essential global dialogues with peers living in Arctic communities by exchanging their investigations of those local environmental problems and innovations. In working through the three lines of inquiry, students are potentially able to compare and contrast across diverse Arctic and non-Arctic settings, making relevant what may have previously seemed irrelevant to students, as well as challenging preconceived notions about urban life across nation-state boundaries.

In its design of three cycles, each potentially involving an exchange of videos, this model aims to push students to develop essential skills in communication with diverse audiences, primarily through an investigation of their own and other's perspectives. Moreover, the storytelling components provide opportunities for students to exercise voice and enhance their digital literacy skills using technology that is often readily available. As such, #60above60 is designed to be an inherently socio-environmental project that brings groups of students together across vast distances to learn about environmental sustainability in multiple contexts. As such, the #60above60 model aims to add potential value for other Arctic efforts, as well as new research avenues in global and environmental education.

In reflecting in this chapter on the core design elements of #60above60 against the literature on global competences, environmental literacies, and student agencies, we note particular limitations. For example, our initial outreach to schools connected with members of the Arctic PIRE research community did not provide a wide enough outreach to ensure that we were incorporating a diverse range of schools, including those that serve traditionally marginalized students. Second, the basis of the program design is readily accessible technology to produce videos, and access to internet connectivity to send and receive videos, excluding schools without readily accessible Internet connectivity. Lastly, as we reflect on our aims and objectives underlying #60above60 against perspectives emerging from literature, of particular importance is the insufficiency of a single platform or single program. Specifically, we are critically reflective of the fact that the direct exchange of student produced videos is not sufficient for students to become aware of their ecological, economic, and cultural connections to international peers. And in fact, they could in some circumstances re-inforce stereotypes about urban contexts in Arctic and non-Arctic contexts. Much depends on the training and perspectives of teachers, how teachers utilize the #60above60 platform in their classroom practices, and the level of reflective questioning taking place. Therefore, in future iterations communication between schools will be much more in depth than the mere exchange of videos, to include opportunities for follow-up questions.

Despite these limitations, we remain hopeful about the #60above60 program. It is vital to develop programs that encourage ecological awareness and global collaboration through civic action by teaching students about climate change in the Arctic, which is warming twice as fast as the rest of the planet (National Geographic, 2017). Moreover, in creating opportunities for students to produce digital stories, we prioritize the youngest generations to be the lens through which stories of climate change and human impacts on the environment can be noted. Why not? The future of the planet is in fact theirs. Providing students opportunities to exercise their voice is arguably the first step in positioning the youngest generation so that they develop the skills and the dispositions to take action on truly planetary issues.

Of course, sustainability challenges like resilience and adaption to climate change are not simply limited to contexts above the 60-degree parallel, mandating place-based, problem-centered, global learning initiatives. Therefore, the #60above model may potentially be adaptable to other latitudes (#60below40; #60atzero). Designing programs of study that encourage students to think, speak, and act in ways that address existing ecological challenges, introduces students to experiences, mental processes, and develops critical capacities necessary to avoid planetary ecological collapse beyond those already underway.

Acknowledgments

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