Exploring Life on the Edge
Aaron Doering, PhD

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Growing up on a farm in rural Minnesota, Aaron developed a passion for the natural world, geography, traditional knowledge, and education. These passions continue to fuel his work today, and are evident in the cutting-edge, technology-enhanced education programs he has spearheaded over the past decade and beyond.

A full professor in Learning Technologies and director of the Learning Technologies Media Lab at the University of Minnesota, Aaron was recognized as a top innovator by the Science Coalition in 2012. He is a pioneer in adventure learning, K12 geospatial learning, and K12 learner-driven technology integration strategies. Aaron is recognized internationally as a Tech Awards laureate, which honors innovators from around the world who are applying technology to benefit humanity. At the University of Minnesota he holds the Bonnie Westby Huebner Endowed Chair in Education and Technology, and is a fellow for the Institute on the Environment. He is also a fellow for both the Royal Canadian Geographical Society and the Explorers Club in New York City.

Aaron has guided and inspired teachers, students, and professionals around the globe through his keynotes and workshops, beautifully crafted online learning environments, award-winning publications, and TEDx talk. Twin Cities Public Television released a documentary in 2017 on Aaron’s work titled “The Changing Earth: Crossing the Arctic.” The documentary transports students and the general public to remote regions of the Arctic to learn about climate change and the unique challenges faced by far-north communities.

The quality of the online learning environments and unique technology-enhanced experiences Aaron has spearheaded, with their focus not only on pedagogy and content but also on user experience and innovative design, are rivaled by few. From his pioneering adventure learning projects, to his innovative design and development work in K12 geospatial learning, to the groundbreaking studies he is leading on intersections between education and sustainability, Aaron exemplifies the positive, pioneering spirit so needed in the field of education. He is a gifted and valued teacher, a man who cares deeply about our planet, and a visionary who is not just talking about change in the world, but actively contributing to it.

Doering is a polar explorer on the scale of a Will Steger or a modern-day Ernest Shackleton—but one who is bringing the frozen world into classrooms from Africa to America. He’s the founder of initiatives including Earthducation, North of Sixty, and GoNorth!—arguably the world’s first MOOC. GoNorth! burst onto the educational landscape in 2003, sending live video of husky dogs and Arctic explorers into K-12 classrooms around the globe; more than 15 million students worldwide collaborated in the online environment. —UMN, 2013
The Changing Earth is harnessing the power of adventure, storytelling, and modern tech to educate learners worldwide about the environment, sustainability, resilience, and the role of traditional knowledge in education. We offer an engaging, standards-based curriculum for K-12 classrooms tied to live field updates from expeditions worldwide. Our online learning environment includes a free online tool for students to Take It Local and share their own investigations in an interactive storyline. We also provide teachers with a free classroom management system.

The mission of the Changing Earth is to help create an environmentally literate and socially engaged generation of learners able to blend traditional and 21st century scientific and cultural knowledge to craft innovative solutions to sustain the Earth and its diverse inhabitants into the unforeseeable future.

thechangingearth.com
Arctic Transect 2004

PROJECT DESCRIPTION
A 6-month, 3,000-mile traverse of the Canadian Arctic from Yellowknife, NWT, to Pond Inlet, Nunavut, this expedition documented climate change in the Arctic. The team met with Inuit Elders and students en route, exploring traditional ecological knowledge in the remote communities along the trail.

ADVENTURE LEARNING
Arctic Transect provided the grounding proof of concept for adventure learning, and, some would argue, was also one of the world’s first MOOCs! Adventure learning (AL) is a hybrid distance education approach first defined in 2006 by Dr. Doering. AL provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative online learning environments, and is anchored in experiential and inquiry-based learning. It includes educational activities that work in conjunction with the authentic experiences of researchers in the field. For example, within an AL program, the curriculum, the experiences and observations of the researchers, and the online collaboration and interaction opportunities for participating learners are delivered synchronously so that learners are able to make connections between what is happening in the real world and their studies, and then reflect on those events and present potential solutions to issues that are raised.

My students think this is the most amazing learning experience they have ever had. From the lesson activities to the online chats, (and) collaboration areas, it is truly inspiring for me as a teacher. . . . my students are talking about what they are learning outside of my classroom. I even have parents inquiring about the program.”
—Jen, 2nd year science teacher

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GoNorth!

PROJECT DESCRIPTION
A series of five free K-12 adventure learning programs delivered online to classrooms worldwide between 2006 and 2010. GoNorth! reached more than three million learners annually across all fifty states and around the globe. Students completed research-based lesson plans while interacting with an Arctic dog-sledding expedition team, scientists, and their peers and teachers. They learned about climate change, Arctic geography and culture, and issues of sustainability, among other topics, as they followed live expeditions that traversed the circumpolar Arctic.

2006: ALASKA NATIONAL WILDLIFE REFUGE
The team journeyed across northeast Alaska through the Arctic National Wildlife Refuge, stopping at five Native communities and one oil platform along the way while investigating impacts of oil exploration and the sustainability of the Earth’s natural resources.

2007: CHUKOTKA, RUSSIA
Traveling to what is considered the most remote Arctic region, the team explored culture and the use of mineral resources in the last secret outpost of the former Soviet Union. Geographically isolated, the peninsula is considered one of the least known places on earth.

2008: FENNOSCANDIA
The team traveled 1,000 miles by dogsled across Arctic Sweden, Finland, and Norway in the Sápmi region, investigating the issues of deforestation with the Sámi people.

2009: BAFFIN ISLAND, NUNAVUT, CANADA
The team explored consequences of transboundary pollution while traveling along the spine of Baffin Island and up the coast of the Arctic Ocean and Baffin Bay in the land of the Inuktitut.

2010: GREENLAND
Brought focus to our oceans, Greenland, and the Kalaallit people as the team explored approaches to sustainable development of the ocean’s resources, sharing their journey and discoveries with millions of schoolchildren worldwide.

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We explore

PROJECT DESCRIPTION

WeExplore is a unique adventure learning (AL) environment that provides students with the opportunity to become explorers pursuing answers to their own questions, and to then share their discoveries with the world. This custom-designed environment scaffolds learners through the process of creating and sharing an adventure learning project online.

Working in teams, students choose a real-world location and geographical, environmental, or social issue that interest them and create an expedition focused on that topic. They then craft a mission statement and a guiding question and begin collecting media and field notes that speak to the question at hand. Using a desktop, laptop, or mobile device, students upload and share their media and findings within the WeExplore online environment. Teams throughout the world follow along with each other's adventures and learning. Students act not only as explorers and expedition leaders, but also serve as teachers and facilitators, strengthening their knowledge of a subject and a geographical area as they communicate with others about it.

Educators can provide as much or as little guidance as desired in setting guidelines and rubrics for learners. WeExplore can be used in both formal and informal learning settings, and can be easily incorporated within existing curriculums tied to geography, STEM learning, digital storytelling, place-based learning, and project-based and design learning, to name just a few examples.

GOALS + OBJECTIVES

» Provide a scaffolded online environment in which learners can generate and follow along with user-driven adventure learning projects

» Motivate learners to pursue answers to their own questions both through adventure-based activities and engagement with mobile and online technologies

» Encourage collaboration and community building as learners work together in teams to both learn about and teach others about real-life issues impacting their local community

» Support and strengthen learners’ 21st century skills as they engage with and create with new technologies

we-explore.com
Geographic knowledge and inquiry skills are key in today’s globally interdependent world. We are facing many challenges that demand an understanding of geographic concepts. These challenges include issues with worldwide impact such as climate change, migration, political unrest, and food security, along with more localized challenges such as freshwater access, deforestation, and land use.

New tools and models are needed to guide teachers and learners alike through the process of geographic inquiry. As geographic inquiry has rapidly embraced new technologies such as geographic informational systems (GIS), opportunities for teachers and students to engage with these technologies is also critical. The geospatial industry is a burgeoning field, feeding an average $73 billion per year into our national economy. According to the U.S. Department of Labor, the geospatial industry is one of the fastest growing technology fields, with geospatial jobs increasing at an annual rate of 30 percent globally and impacting multiple career paths.

Geographic learning offers a broad range of skills, spatial understanding, and technology training. It presents, too, an understanding of culture and the changing nature and relationship of human and environmental systems around the globe.

To address these challenges, the Learning Technologies Media Lab at the University of Minnesota designed and developed a new online learning environment, EarthXplorers. EarthXplorers offers an inquiry- and project-based approach to learning GIS. Its mission is to scaffold middle and high school students and teachers through the process of geographic inquiry using ArcGIS in conjunction with field-based activities, data collection, analysis, spatial visualization, and storytelling.

EarthXplorers is a unique innovation on several fronts. (1) It seamlessly integrates ArcGIS within its environment, scaffold- ing teachers and learners alike in the real-world use of GIS to problem solve contemporary issues. (2) It focuses on authentic geography learning and uses the national geography standards to undergird the learning process. (3) It uses spatial thinking and user-driven design to help us understand how people learn. (4) It encourages learners to be storytellers as well as scientists, with a goal of fostering deeper engagement with and understand- ing of content. (5) It allows teachers new formative assessment opportunities as they follow students’ critical thinking process as students identify guiding questions and communicate findings.
PROJECT DESCRIPTION
As we travel to climate hotspots on all the continents, we are collaborating with cultures from around the world to collectively explore how education can influence sustainability and the future of our planet.

2011: BURKINA FASO, AFRICA
This small, landlocked nation faces tremendous impacts from climate change. The Earthducation team journeyed over 1,000 miles through Burkina, interviewing individuals in 17 villages, towns, and cities.

2011: NORTHERN NORWAY, EUROPE
The team explored a sparsely populated, water-saturated landscape while engaging with distinct cultures, languages, and diverse ecosystems throughout Arctic Norway.

2012: AUSTRALIA
Traveling from the most densely populated region of Australia to the sparsest, the team captured the great diversity of cultures, landscapes, and ecosystems that make up this driest inhabited continent on Earth.

2012: PERU & CHILE, SOUTH AMERICA
The team traveled from the Amazon Rainforest in Peru to the Atacama Desert to Patagonia in Chile. They investigated fog harvesting, traditional cultures, the world’s driest desert, and the wonders of Patagonia while conducting interviews and visiting schools.

2013: ARCTIC ALASKA & CANADA, NORTH AMERICA
For expedition 5, Earthducation joined forces with the North of Sixty° project. A small team pulsed over 100 miles through remote Arctic wilderness on Baffin Island. They also visited schools in both Alaska and Canada, and interviewed elders and community members about the changing climate and culture.

2014: NEPAL, ASIA
The team traveled from the urban center of Kathmandu, to the tourist mecca of Pokhara, to the remote mountain village of Nangi—a model for innovative educational practices and rural sustainability.
PROJECT DESCRIPTION
The mission of North of Sixty° is to create a global tapestry of climate stories, weaving together the history and culture of Arctic communities worldwide and preserving the voices and ecological knowledge of generations. We are collaborating with classrooms in regions north of 60 degrees latitude, scaffolding students in the collection and dissemination of these stories and providing mobile technology kits and an online environment for them to share their stories with the world.

THE GOALS
» Create a global tapestry of Arctic climate stories
» Educate the world about the Arctic and about climate change through personal lenses
» Preserve the stories of elders, knowledge keepers, and others
» Encourage collaboration and community building among students
» Provide students with an online venue to share and document living history
» Support and strengthen students’ 21st century skills as they learn new technologies

THE EXPEDITION
A small team of North of Sixty° explorers also undertook an expedition in April 2013, pulling over 100 miles between the small communities of Qikiqtarjuaq and Pangnirtung on Baffin Island in Nunavut, Canada. They visited schools and interviewed teachers, students, elders, and others in both communities, while providing regular online updates about their journey and educating learners worldwide about Inuit culture and language as well as the changing landscape and climate in the Arctic.
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