Aaron H. Doering

Director, Learning Technologies Media Lab, and Professor
University of Minnesota
Bonnie Westby Huebner Endowed Chair in Education and Technology
Institute on the Environment Fellow

Dr. Doering's Adventure Learning projects are world renowned and unique in their ability to engage learners. Dr. Doering must be considered one of the greatest influences of our time in the area of innovative uses of technology to support transformational learning. At a time in history when many parents, teachers, and even nations are concerned that technology is causing our children to be disconnected from reality and out of touch with the real world, the technology-enhanced learning experiences developed and implemented by Dr. Doering have brought millions of learners more closely in touch with the precious richness and kindness of human reality, including the dangers of cold environments and simple joys, such as having dogs as companions, in our lives. These bring us closer in touch with the reality of human experience. They intimately connect, rather than distance and disconnect the learner from reality. Dr. Doering's pioneering work in innovative ways to use technology to transform teaching and learning has truly been of service to our society.

Gerald A. Knezek, PhD
Regents Professor of Learning Technologies
Director of the Institute for the Integration of Technology into Teaching and Learning
University of North Texas

Nomination of Professor Aaron Doering
for the Brock International Prize in Education

12 August 2015

It is my absolute pleasure and privilege to nominate Dr. Aaron Doering for the 2016 Brock International Prize in Education. Aaron is an online and adventure learning pioneer who has spurred innovation in education through the merger of technology, storytelling, learner-centered pedagogy, and adventure-based narratives. Since the early 2000s, his large-scale expeditions tied to collaborative online learning environments have reached more than 15 million learners on six continents, engaging them in real time with people, places, and cultures impacted by a rapidly changing climate and way of life. Aaron has spearheaded more than a dozen free technology tools and adventure learning environments for learners to co-create their own inquiry-based adventures and share their cultures, communities, and investigations with the world. The quality of the online learning environments and unique technology-enhanced experiences he has generated, with a focus not only on pedagogy and content but also on user experience and innovative design, are rivaled by few.

The director of the Learning Technologies Media Lab (LT Media Lab) and a full professor in Learning Technologies at the University of Minnesota (UMN), Aaron was a 2008 laureate of the prestigious international Tech Awards (honoring innovators who apply technology to benefit humanity). He was recognized as a top innovator by the Science Coalition in 2012, and a top modern-day explorer by *Canadian Geographic* in 2015. In addition to his academic and administrative positions at UMN, 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 the Royal Canadian Geographical Society, and the co-director of the Minnesota Alliance for Geographic Education.

Aaron's early passions for the natural world, geography, traditional knowledge, and education, which he developed growing up on a family farm in rural Minnesota, continue to fuel his work today. They are evident in the many cutting-edge, technology-enhanced education programs he has spearheaded. These programs, which are introduced in the pages that follow, are literally changing the way that teachers teach and students learn. His adventure learning approach has been adopted by a diverse array of educators — from K12 teachers to renown explorers, indigenous groups, university researchers, and a Canadian business school. He has been invited by organizations as diverse as the California Academy of Sciences, CHS (a leading farmers cooperative), and geospatial technology pioneer ESRI to speak about adventure learning and how it might be incorporated into their learning programs.

Aaron has produced an exceptional number of journal publications, conference presentations, and keynotes, with more than twenty-one keynotes delivered at international conferences in the past two years alone. He is the co-author of the leading educational technology textbook, *Integrating Educational Technology into Teaching*, along with *The New Landscape of Mobile Learning: Redesigning Education in an App-based World*. He has been interviewed by CNN, CBC, NPR, and numerous other media organizations as an international authority on adventure learning, K12 geospatial learning, and K12 learner-driven technology integration strategies.

Aaron has guided and inspired teachers, students, and professionals around the globe. He exemplifies the positive, pioneering spirit so needed in the field of education, with a focus on innovation and solution-crafting. He is a gifted and valued educator, a man who cares deeply about our planet and the diverse peoples who inhabit it, and a visionary who is not just talking about change in the world, but actively contributing to it. He works tirelessly to provide free online educational opportunities to teachers and students worldwide, and to promote cultural and environmental awareness through engaging learners with real-world events, people, and issues.

Aaron is, without question, deserving of the Brock International Prize in Education. I offer my full and unwavering endorsement of him and his work, and encourage the Brock jury to consider him the top candidate for this award.

Sincerely,

Jeni Henrickson, Associate Creative Director
Learning Technologies Media Lab
College of Education and Human Development
University of Minnesota

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July 29, 2015

Dr. Jeni Henrickson
Associate Creative Director, LT Media Lab
College of Education and Human Development
University of Minnesota

Dear Dr. Henrickson:

This letter is written to express my enthusiastic support for the nomination of Dr. Aaron Doering from the University of Minnesota for the Brock International Prize in Education. I have known of Dr. Doering's work for more than a decade, primarily through my regular review of the literature related to educational technology and from attending two presentations he gave at international conferences.

Dr. Doering has carved out a remarkably robust and productive research and development agenda that focuses on areas of critical need everywhere. Frankly, I cannot think of any education professor who has reached as many students and teachers around the globe as Dr. Doering has through his innovative "Adventure Learning" initiatives.

Coincidentally, Dr. Doering and I both began our education careers as social studies teachers, and interestingly we both went on to publish papers in the venerable *Journal of Geography*. If I could begin my academic career again today, I would seek to become one of Dr. Doering's Ph.D. students and join him in conducting educational design research to test, refine, and disseminate his Adventure Learning model. It is no surprise that he is currently advising or co-advising numerous doctoral students. I know quite well the work of two of the previous young scholars (Dr. Charles Miller and Dr. George Veletsianos) who graduated under his supervision, and both are superb scholars.

Dr. Doering's Adventure-based Transformational Learning model appropriately puts pedagogy ahead of technology, and second, it is informed by rigorous and iterative educational design research methods. The exceptional merit of this unique research agenda pursued by Dr. Doering and his team is attested to by the substantial external funding it has attracted from the National Science Foundation, the National Geographic Society, the Best Buy Children's Foundation and other sources. The prospects for continuing funding in this and other areas of Dr. Doering's research and development initiatives are excellent.
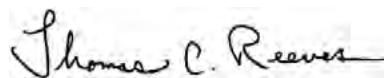
In my experience, the most productive people in higher education today combine multiple forms of scholarship with creative development efforts. Dr. Doering is just such a scholar, with special strengths in STEM, social studies, and environmental education, the integration of enhanced pedagogical strategies into e-learning, and teacher professional development. Dr. Doering's efforts to push the envelope of online and mobile learning are yielding both practical solutions to real world educational challenges and new knowledge in the form of reusable design principles that can guide his own future scholarship as well as the work of the larger educational technology community.

A few years ago, I published an invited paper titled "Can Educational Research Be Both Rigorous and Relevant?" in the online journal *Educational Designer*. Although in my experience too much of the research in educational technology has inadequate rigor and insufficient impact, Dr. Doering's research shows that it is possible to be both rigorous and relevant. Dr. Doering has put his mind and body to the test in places as diverse as the Arctic, Sub-Saharan Africa, and the Australian bush in pursuit of making education more engaging and ultimately more effective for students around the world. In doing this and more, Dr. Doering has carved out a reputation as one of the brightest stars in the field of educational technology both nationally and internationally, and I fully expect him to be someone who continues to make exceptionally valuable scholarly and practical achievements for many years to come.

Dr. Doering's research and development initiatives demonstrate that it is only when we emphasize high quality content and appropriate pedagogy rather than technology per se that we can realistically expect to influence learning in ways and at levels that are educationally and socially significant. Dr. Doering's extension of the Technological Pedagogical Content Knowledge (TPACK) model is just one example of how he recognizes that while cutting-edge technology can provide important affordances, authentic learning activities and engaging content are what really matter most in education.

With these and other accomplishments in mind, I enthusiastically endorse Dr. Doering for the Brock International Prize in Education. The criteria for this award state the innovation "must have the potential to provide long-term benefit to humanity through change and improvement in education." I am certain that there will be many wonderful nominations for this award, but I can't imagine any innovations that meet this standard better than Dr. Doering's Adventure Learning initiative. Thank you for your consideration.

Sincerely,

Thomas C. Reeves, Ph.D.
Professor Emeritus of Learning, Design, and Technology

July 28, 2015

Selection Committee
Brock International Prize in Education

Dear Members of the Selection Committee:

It gives me great pleasure to write a letter supporting Dr Aaron Deering's nomination for the Brock International Prize in Education. I have known him as a professional colleague for over twenty-five years. I have watched his career develop from that of an outstanding high school teacher in Rochester Minnesota, to his current position as an endowed professor and director of the Learning Technologies Media Lab at the University of Minnesota. Throughout these years he has impressed me with his desire and ability to reach outside the confines of his very busy academic life within the University to work with teachers and students in a wide range of settings within Minnesota and around the world. The University of Minnesota has a long and proud tradition of geography in the College of Liberal Arts, but not one of that faculty has impacted so many people in so many places around the world as Aaron has. He is a unique professor.
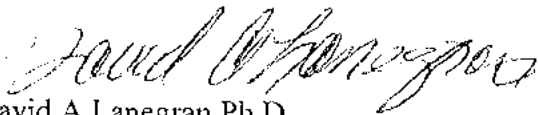
His primary contribution to the American educational establishment, from my standpoint, is his ability to form personal connections between distant and diverse populations and young learners through his specialized online learning environments and expeditions. These programs have had an incredible impact around the world. I have always been very impressed with Aaron's ability to make his material accessible to the novice, and exciting or challenging for more experienced teachers and students.

Among Aaron's many funded projects was a National Geographic Society grant focused on how to use mapping software to teach critical geography with a curriculum that is grounded in the insights of authentic pedagogy. Every teacher who has used his online learning environment that stemmed from this grant is filled with praise for this learning experience he developed. Aaron's online learning environment is distinctive because it enables students to use the software to think critically about geographical issues. The lessons are challenging intellectually but rather easy to do technically thanks to the user-friendly interface. Aaron is now moving forward to develop additional geographical and cultural learning experiences using Geographic Information Systems, combining his WeExplore online environment and experiential learning, for example. These projects will enable students to dramatically expand their horizons and help them gain a deep understanding of places and people. And they are provided free to teachers and students worldwide.

In my roles as Coordinator of the Minnesota Alliance for Geographic Education. President of the National Council for Geographic Education, and Chief Reader of the College Board Advanced Placement Exam in Human Geography I have worked with faculty from colleges and departments of education from across the country. I have yet to work with a young scholar who is as well grounded in the theories and techniques of geography, or as creative and able a teacher as is Aaron Doering. In addition I have yet to meet a young scholar who is so capable of bringing the advancement of the academy to so many and so diverse of communities.

I enthusiastically support his nomination for the Brock International Prize in Education.

Sincerely yours,

David A Lanegran Ph.D.
John S Hall Endowed Chair in Geography
Coordinator of Minnesota Alliance for Geographic Education

August 10, 2015

To whom it may concern:

I am very pleased to write this letter in support of Dr. Aaron Doering's nomination for the Brock International Prize in Education.

I met Dr. Doering in 2003 when I was exploring graduate programs in learning technologies. I have worked closely with Dr. Doering since then. He employed me as a research assistant and has served as an adviser for my master's thesis and doctoral dissertation. He has been an exceptional colleague and mentor and has gone to great lengths to ensure that our long-lasting collegial relationship contributes to improving worldwide education efforts.

Dr. Doering is an exemplar researcher, educator, and activist who has dedicated his life and career to bettering education. His passion is contagious and can be seen on a daily basis through his teaching and research. He is always excited, positive, fair, accommodating, and welcoming, making his students and colleagues feel comfortable. His classes are places where community and bonds are formed, where relationships and friendships are created. His research efforts engender similar qualities. His Adventure Learning projects have made a difference in the lives of millions of students throughout the world. These projects are empowering and respectful, and the model of education that he has created has inspired many others to search for similar outcomes!

I used to work with Dr. Doering on the GoNorth project, and his video/audio updates from the Arctic would frequently start with the same greeting: "This is for my students at the University of Minnesota." Very few people would think of their students when they haven't seen their family in weeks and are in sub-zero, body-wrenching temperatures in one of the world's most remote places!

Dr. Doering also seeks to make a difference by eagerly serving as a mentor to educators and scholars. He encourages people to be the best they can be, allowing them to choose their own path to success, while at the same time providing valuable feedback and guidance. I am absolutely certain that I would not be where I currently am without his guidance and support. He has always encouraged me to succeed and to push the boundaries of what I can achieve.

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LIFE.CHANGING

Dr. Doering's research has also made significant impact in educational. His work is recognized by leading figures in the field and he has been repeatedly invited to share his work in numerous conferences, journals, and professional periodicals. One example of this is exemplified by his authorship of the well-known *Integrating Educational Technology into Teaching* book. This book is the most popular book to teach pre-service teachers on how to integrate technology in their classroom and Dr. Doering was the person entrusted with re-envisioning the use and future success of this text.

Thank you for the opportunity to comment on Dr. Doering's work. His scholarship, research, mentorship, and passion for improving education have made the world a better place, and I am honored to call him a colleague.

If I may be of further assistance, please do not hesitate to contact me.

Sincerely,

George Veletsianos, Ph.D.
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LIFE.CHANGING

ADVENTURE LEARNING IMPACT

"Given Aaron's tenacity and commitment to brave the elements and journey to latitudes that most of us only experience on TV or when holding a globe in our hands, the authenticity and richness of his data pools are perhaps unmatched among educational scholars and researchers. Add to that fact the motivation and excitement that his efforts bring to K-12 children around the globe and you find someone who is pushing the edges of not only his research but of technology-enhanced pedagogy in general. Aaron brings the world into the classroom and the classroom into the world in some of the most novel ways ever imagined."

Curtis J. Bonk, PhD
Professor, Indiana University
Instructional Systems Technology Department
School of Education

"Adventure learning is an exemplary model for teaching science in the K-12 classroom."

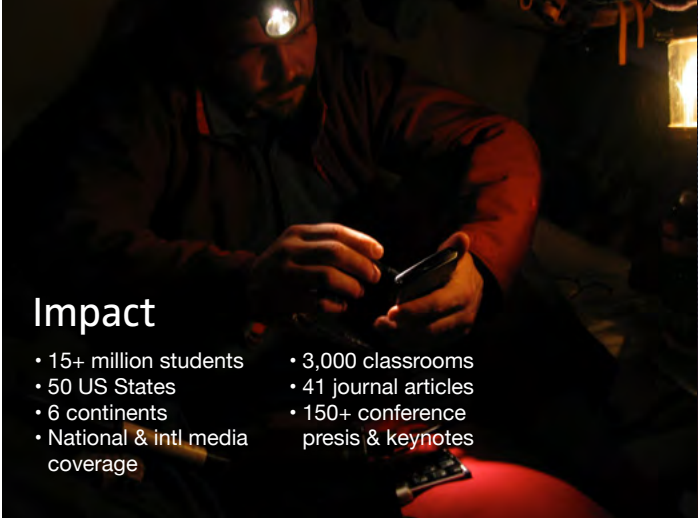Renee Crain, Program Manager, National Science Foundation, 2006

"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."

University of Minnesota cover story, October 29, 2013
http://discover.umn.edu/news/vision-leadership/space-management-setting-bar-operational-excellence

"Adventure Learning is genius on demand, bringing STEM alive in the K-12 classroom."

Tech Awards: Technology Benefiting Humanity, 2008

ADVENTURE LEARNING IMPACT

More than three dozen studies have been employed identifying the theoretical foundations of adventure learning (AL) and investigating student learning, motivation, and teacher pedagogy within AL programs. Studies of AL environments have shown that when content is authentic and situated, and when learners have opportunities to actively participate in the online learning environment, the learner is more likely to engage with and understand the content (Doering, 2007; Doering & Henrickson, 2014; Doering, Scharber, Riedel, & Miller, 2010; Henrickson & Doering, 2013a; Moos & Honkomp 2011; Veletsianos & Doering, 2010; Veletsianos, Doering, & Henrickson, 2012). Doering and Miller (2009) noted with respect to the GoNorth! AL series, that "student engagement often escalates to unparalleled levels due to the authentic narrative that unfolds throughout each project" (p. 1614). Moos and Honkomp (2011) showed that "results indicated that the participants significantly improved their score from the pretest to posttest after using this AL environment. . . . the qualitative data from the semi-structured interviews suggest that AL positively affected [student] motivation, which in turn facilitated learning" (p. 43). Further, the collaborative components of AL make environments based in this framework particularly conducive to community building (Henrickson & Doering, 2013a). The most recent study (Doering & Henrickson, 2015) was published in the Journal of Technology and Teacher Education in 2015 and looked at the impact of user-driven adventure learning on creativity.

Impact

- 15+ million students
- 50 US States
- 6 continents
- National & intl media coverage
- 3,000 classrooms
- 41 journal articles
- 150+ conference presis & keynotes

Since 2004, adventure learning programs have engaged more than 15 million students in 3,000 classrooms worldwide. The most recent programs have had a central goal to deliver an online transdiciplinary K-12 program focused on environmental issues such as climate change, cultural and geographical awareness, and sustainability. The adventure learning approach has garnered attention from national, international, and regional media outlets as well as within academic circles, with Doering recently being featured on The Weather Channel, CNN, and CBC television, along with radio features on Minnesota Public Radio and CBC, and print and web features in numerous regional publications.

Hundreds of schoolchildren greeted the Arctic Transect 2004 expedition team at the airport on the team's return from their 6-month dogsledding expedition. The team was delighted to learn that Timber, one of their sled dogs who posted a regular blog in the online learning environment, was so popular that the students wanted him elected president.

A BRIEF HISTORY OF ADVENTURE LEARNING

IIn literature and real life, adventure captivates our imagination and draws us into its path. We become caught up in wonderment of the risk being undertaken, the uncertain outcomes in the balance, and the courage, strength, and daring displayed by those involved. It can be a transformational experience for participants and observers alike.

Adventure is typically defined as an event involving risk, challenge, and excitement, as an out-of-the-ordinary experience whose outcome at the start is unknown (Merriam-Webster, 2012; Miles & Priest, 1990; Weir, 2004). It does not need to involve a physical challenge; the challenge may instead be purely of the mind (e.g., via an immersive online game). It is, however, inherently experiential, and particularly so if reflection and sharing are built into the experience, along with opportunities to practice solving real-world issues. It has the potential to help build deep connections to the natural world, and both reflection on and action toward solving real-world issues.

Adventure has been incorporated into education in a variety of ways throughout history: through literature, outdoor and physical education, field-based exploration and research, and most recently, technology, which has, for example, allowed learners to journey virtually along with explorers and scientists on expeditions to the far-reaches of the world. Technology has in fact enhanced and expanded the types of adventures we can engage in today, such as through advances in equipment and tools that allow us to explore regions of the planet that were previously inaccessible, or to participate in events previously unimagined via the personal computer, the Internet, and mobile devices.

The purposeful use of adventure in education perhaps began with the formation of an expeditionary society for boys in Great Britain in 1932. The Public Schools Exploring Society allowed boys the opportunity to participate in adventure experiences abroad. It was founded with an educative mission grounded in experiential learning, with the goal of teaching that exploration had a scientific end and was not just a pleasure trip or adventure for adventure's sake (Allison, Stott, Felter, & Beames, 2011). It may be argued, however, that adventure has in fact been part of education since ancient times, as some indigenous cultures have sent youth into the wilderness on quests of personal discovery and challenge as part of cultural, wilderness, and survival

learning processes for many hundreds of years (Berry, 2011; Miles & Priest, 1990).

Adventure today is infused into numerous aspects of our lives and society: adventure travel, adventure sports, and adventure games to name a few; along with movies, books, and scientific explorations. Some forms of adventure exist purely for the thrill-seeker, for the fun of it; they are not necessarily intended as learning or growth experiences. There are, however, ways that adventure is being incorporated into both formal and informal education that combine the risk-taking, adrenaline-producing, imagination-inspiring elements of adventure with a sound pedagogy to produce rich learning experiences with multiple benefits. The best known of these learning models are adventure education and adventure learning.

Seminal thinkers who have influenced the adventure education approach to learning include John Dewey and Kurt Hahn. Dewey focused on the importance of spurring a continuum of learning where students are learning not just from teachers but also from their peers and their environment as they draw on and extend preexisting knowledge. He wrote, "Every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after" (1938, p. 35). Dewey also emphasized the role of collaborative learning and creative problem solving in education.

Hahn was a German educator who founded schools in Germany and Great Britain that were grounded in experiential and service-based learning with a focus on character development (Berry, 2011). Adventure education might in fact be considered an outgrowth of organizations such as the aforementioned Public Schools Exploring Society, along with the growing interest in experiential education beginning in the first half of the twentieth century, and the creation of schools and organizations such as the Salem School (www.salem-net.de/en/home.html), Gordonstoun School (www.gordonstoun.org.uk), and Outward Bound (www.outwardbound.org), all of which were founded by Hahn.

Adventure education has taken the form of team/trust building, cooperative games, physical education, and outdoor risk challenges (e.g., high ropes courses, nature and wilderness activities, expeditionary pursuits). It typically occurs within small-group settings, with the learning and experience limited to the individual and the

small group. While adventure education is not restricted to outdoor pursuits, it is often associated with the outdoors and environmental and sustainability education, and is typically employed in informal or nonformal settings.

In adventure education programs, participants are physically or psychologically challenged, with a focus on risk-taking, problem solving, and individual psychological growth and development (Berry & Hodgson, 2011; Miles & Priest, 1990). Typical desired learning outcomes of adventure education include enhanced self-concept and interpersonal skill building (Hattie, Marsh, Neill & Richards, 1997). Hattie et al. (1997) identified six specific outcome areas for adventure education: leadership, self-concept, academic, personality, interpersonal,

Adventure Learning

In the early 1990s, explorers such as Will Steger, Dan Buettner, Robert Ballard, Lonnie Dupre, and Paul Pregont began experimenting with ways to use technology to connect classrooms with their adventures on the trail in the hopes of educating students about environmental and social issues worldwide. These experiments led to the development in 2004, by Dr. Aaron Doering and his team, of Arctic Transect 2004 — a 3,000-mile dogsled journey across Arctic Canada that was tied to a comprehensive 300+ page curriculum and an online learning environment centered on transdisciplinary education — and the establishment of a new pedagogical framework by Doering (2006) known as adventure learning.

Adventure Learning Principles, Practice, and Community models (Doering, 2009).

and adventuresomeness. Formal processing or reflection activities are incorporated into some, but not all, adventure education programs, with other programs taking instead the nonfacilitiated, or "mountains speak for themselves," approach (Bunyan, 2011; James, 1980).

Examples of adventure education programs include Project Adventure (www.pa.org), Outward Bound (www.outwardbound.org), and the National Outdoor Leadership School (NOLS; www.nols.edu). There are, however, many smaller organizations, including environmental learning centers and community nature centers, that incorporate adventure education into their programming (for example, see the Eagle Bluff Environmental Learning Center in southeastern Minnesota at www. eagle-bluff.org).

Adventure learning (AL) provides a framework for the design of learning experiences that allow learners to explore real-world issues through authentic, field-based narratives within an interactive online learning environment (Doering, 2006, 2007). AL blends experiential (Dewey, 1938; Kolb, 1984), inquiry-based (Bransford, Brown, & Cocking, 1999), and authentic (Jonassen, 1991) learning, and synchs an online learning environment with teacher-led classroom activities. It is grounded in nine core principles: (1) a defined issue and place; (2) authentic narratives; (3) an element of adventure; (4) a sound curriculum grounded in inquiry; (5) collaboration and interaction opportunities between learners, experts, teachers, and content; (6) synched learning opportunities that tie together content with curriculum; (7) an online venue to deliver content; (8) multiple me-

dia that enhance the curriculum; and (9) scaffolding for teachers as well as learners (Doering, 2006; Doering & Miller, 2009).

To illustrate, within an AL program, a team engages in an adventure-based expedition or exploration centered on a specific location and social or environmental issue; for example, climate change in the Arctic. The team travels out into the field to capture authentic data and narratives that are synched with a predesigned inquiry-based curriculum tied to that expedition, issue, and location. The field experiences, data, media assets, and observations of the team are shared online in an environment in which learners are able to actively participate and collaborate with the explorers, their peers around the world, their teacher(s), and a variety of field experts. These online collaboration and interaction opportunities allow learners to form connections between what is happening in the real world and their studies. Learners complete activities related to the real-world events, engage in online and face-to-face discussions around them, and present potential solutions to issues that are raised.

Adventure learning moves adventure beyond the realm of individual and small-group participation to online learning in classrooms throughout the world. Unlike adventure education, AL is not an isolated learning experience with a small group of participants. Reflecting on the experience, sharing it with others, and synching it with a curriculum and interactive online educational activities are central to AL. AL also targets not only building awareness and understanding of an issue, but becoming actively involved in problem solving real-world issues and crafting innovative solutions to them.

A prime example of an AL program is the GoNorth! series of circumpolar dogsledding expeditions (2004-2010), "a program whose central goal was to deliver an online multidisciplinary K–12 program focused on climate change, sustainability, and Arctic culture" (Veletsianos, Doering, & Henrickson, 2012, p. 48). During GoNorth! Arctic National Wildlife Refuge 2006, for example, the AL team journeyed by dogsled across northeast Alaska through the Arctic National Wildlife Refuge. They stopped at five Native communities and one oil platform along the way while investigating impacts of oil exploration and sustainability of the Earth's natural resources. Learners followed along online, completing activities related to the issues the team was investigating in the field; interacting with the expedition team, leading polar scientists, and Native communities;

and contributing their own projects and ideas aroudn the issues at hand. A school in Kaktovik, Alaska, even contributed a blog to the GoNorth! AL environment, with the students there sharing their unique firsthand perspective of life in the Arctic. This AL approach, tying existing curriculum into what is happening in society today, provides authentic and meaningful learning opportunities (Doering, 2006, 2007; Henrickson & Doering, 2013a; Koseolu & Doering, 2011; Moos & Honkomp, 2011; Veletsianos & Doering, 2010).

Past research (Doering, Miller, & Veletsianos, 2008; Doering, Scharber, Riedel, & Miller, 2010; Henrickson & Doering, 2013a, b; Veletsianos, Doering, & Henrickson, 2012) noted that students and teachers alike are motivated to learn and teach at levels they have never experienced prior to AL. Students were motivated to enter the online learning environment both at school and at home while encouraging their teachers to continue use of the GoNorth! program. Moreover, teachers within schools using AL programs motivated one another to get involved as a result of the documented student learning.

In AL, field expeditions and authentic narrative play a key role. The field expeditions form the heart of the program. They bring excitement, engagement, and challenge to the learning and serve as journeys of discovery that are synched with the AL curriculum. These field expeditions also offer a means to gather authentic narrative, data, and media assets to be shared with learners. The narratives and media involve much more than simply capturing the voices of the explorers as they embark on the field expedition. The focus of the expedition is on capturing the narratives of the people who live and/or work in the place where the expedition is taking place and/or who are connected to the real-world issue being explored (e.g., field scientists, Indigenous Elders leaders, and knowledge keepers).

Technology also plays an important role in adventure learning, from the collection of assets to the delivery of the AL program online. Expedition teams typically make use of laptops, GPS units, cameras, audio recorders, and satellite technologies, among other items, to collect and share data, media, and narratives from the field within the online learning environment. Participating classrooms have traditionally used desktop and laptop systems to access AL learning environments, along with multiple tools and software to, for example, engage in online chats with the project team and outside field experts; complete authentic activities to share online; and collaborate with other learners online.

AL programs have been consistently shown to serve as an effective means to engage students in learning, involving students in active and innovative problem solving, and as a successful model for interdisciplinary teaching and learning that integrates real-world issues and inquiry-based learning across the curriculum (Doering, 2007; Doering & Miller, 2009; Doering & Veletsianos, 2008; Doering, Scharber, Riedel, & Miller, 2010; Koseoglu & Doering, 2011; Moos & Honkomp, 2011; Veletsianos & Doering, 2010). Further, AL programs have been shown to offer potential for providing impactful teacher professional development and to influence teacher motivation and learning (Veletsianos, Doering, & Henrickson, 2012).
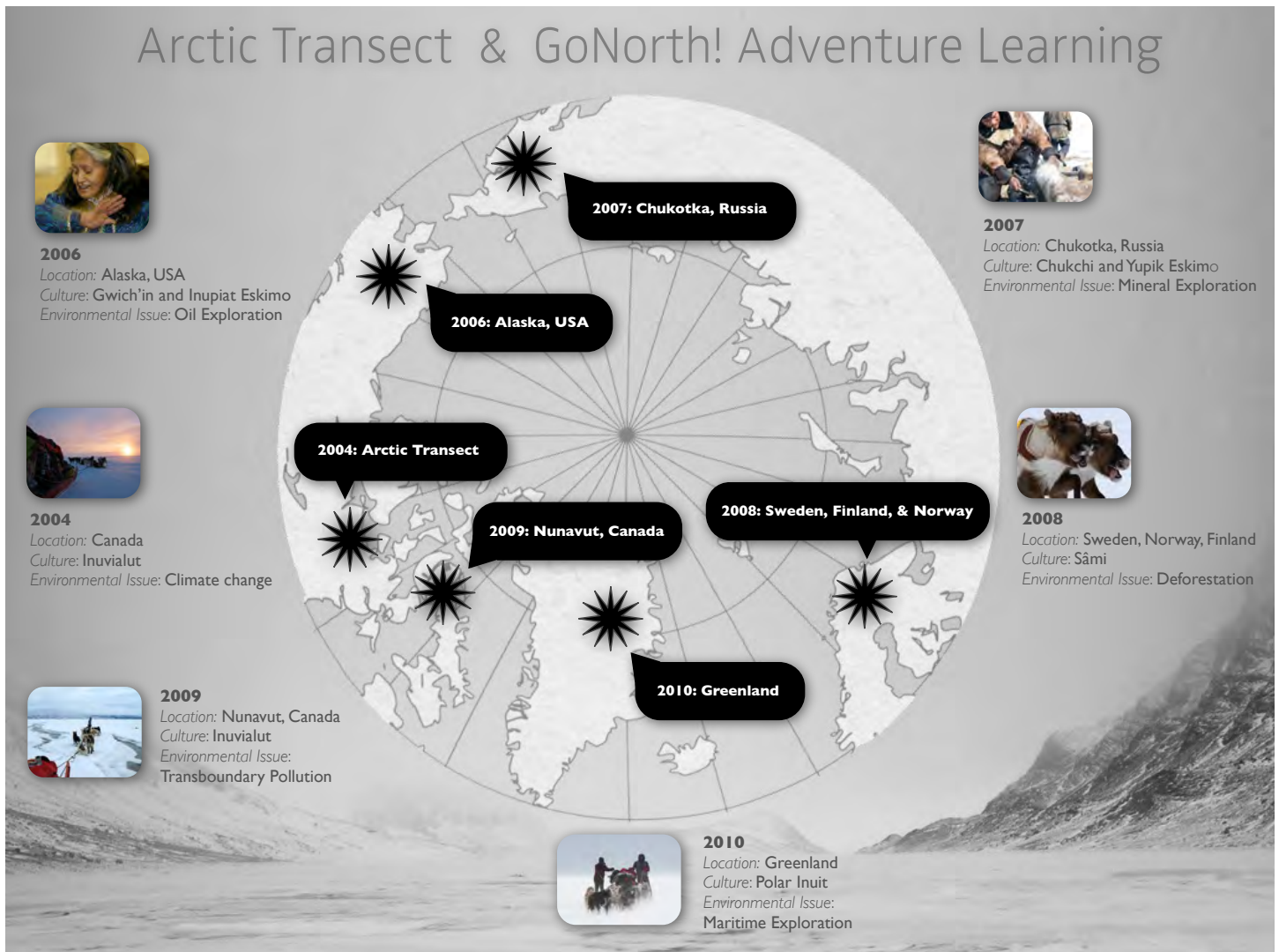
Many online learning environments use generic or stock media and text to feed content to the learner, are focused largely on cognitive elements, and offer no venue for learners to interact with each other or share their questions, stories, and discoveries. They thus miss the opportunity to generate a more meaningful, personalized, and engaging experience (Parrish & Botturi, 2009; Wilson, Parrish, & Veletsianos, 2008). One of the goals of an AL environment is to move beyond stagnant and generic transmittal of information to a passive audience. AL seeks instead to immerse and engage the learner in the issue and location, generate critical and creative thinking and active reflection on the issue, and inspire learners to become involved in finding innovative local and global solutions to real-world issues (Doering & Veletsianos, 2008). In sum, one of the major goals of AL is to help generate transformative learning.

Transformative learning disrupts a learner's perception of an issue and challenges them to reflect critically upon previously held assumptions and beliefs about that issue or about other people (Mezirow, 1991, 1997). It also leaves an enduring imprint on learners and enhances their ability to creatively and collaboratively solve problems and to transfer their learning across domains (Wilson, Parrish, & Veletsianos, 2008). AL has been recognized as an example of a framework that has the power to generate transformative learning (Veletsianos & Kleanthous, 2009; Wilson & Parrish, 2011).

The most recent advancement in adventure learning has been the creation of environments and tools to put students and teachers in the role of AL designers and leaders. The introduction of user-driven adventure learning environments (UDALE) such as *WeExplore* (http://we-explore.com, Doering, 2013) along with new online and mobile tools and technologies are making it easier than ever for teachers and learners to extend learning well beyond the walls of the classroom. UDALE affords learners the opportunity to engage in their own field investigation while concurrently teaching others about a real-world issue, sharing authentic data and narratives, and employing technology for data collection, disbursement, and collaborative involvement with other learners and field experts (Doering & Henrickson, 2015).

Arctic Transect & GoNorth! Adventure Learning

2006
Location: Alaska, USA
Culture: Gwich'in and Inupiat Eskimo
Environmental Issue: Oil Exploration

2004
Location: Canada
Culture: Inuvialut
Environmental Issue: Climate change

2009
Location: Nunavut, Canada
Culture: Inuvialut
Environmental Issue:
Transboundary Pollution

2007: Chukotka, Russia

2006: Alaska, USA

2004: Arctic Transect

2009: Nunavut, Canada

2008: Sweden, Finland, & Norway

2010: Greenland

2007
Location: Chukotka, Russia
Culture: Chukchi and Yupik Eskimo
Environmental Issue: Mineral Exploration

2008
Location: Sweden, Norway, Finland
Culture: Sâmi
Environmental Issue: Deforestation

2010
Location: Greenland
Culture: Polar Inuit
Environmental Issue:
Maritime Exploration

ARCTIC TRANSECT 2004

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.

Arctic Transect provided the grounding proof of concept for adventure learning, and, some would argue, was also one of the world's first MOOCs! The online learning environment included a 300+ page curriculum and pedagogical guidelines for teachers along with collaboration zones where classrooms could share their own work and ideas online as well as interact with the expedition team, field scientists, and Arctic communities.

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

I loved going online because it helped us understand what the teacher was teaching. We would actually be able to see it all in action and be part of it. —Penelope, 5th grade student

Go North!

A series of five free K-12 adventure learning programs delivered online to classrooms worldwide between 2006 and 2010. *GoNorth!* reached more than 3 million learners annually across all 50 states and around the globe. Students completed research-based lesson plans while interacting with the Arctic dogsledding 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 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 the 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.

Each expedition included a comprehensive 300+ page curriculum & teacher guide tied to standards.
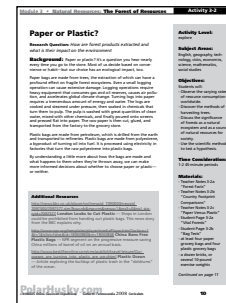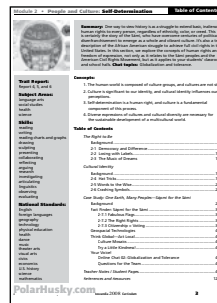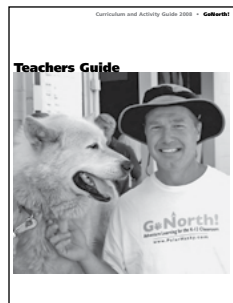
Learn more about Arctic Transect 2004 and GoNorth! at
http://chasingseals.com/gonorth

Adventure Learning: Transformative hybrid online education

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Adventure learning (AL) is a hybrid distance education approach that provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative learning environments. This article defines this online distance education approach, outlines an AL framework, and showcases an AL archetype. In AL environments, classroom teachers are not positioned in the role of teacher/facilitator/designer in the online learning spaces. AL online spaces are collaborative spaces where students, teachers, subject experts, and AL team members interact with one another; these are community spaces where traditional hierarchical classroom roles are blurred. Students' roles transform due to the flexibility and design of the AL learning environments as they move from student to reflective practitioner, providing for new ways of learning and teaching.

Introduction

Education delivered via the Internet is given many terms throughout the world, ranging from virtual education to Web-based learning. A snapshot of distance education practices reveals great variation from country to country, as well as in the extent and form of implementation (Farrell, 1999). One view of distance education is online education within the USA where the landscape of K-12 education is rapidly changing. Online education in K-12 schools is gaining a great deal of attention as more school districts utilize the Internet, which provides increased educational opportunities and flexibility for teachers and students. Online education is both feasible and supported by the high percentage of K-12 classrooms with Internet access: 92% of public schools have Internet access in instructional rooms and the ratio of students to instructional computers with Internet access in public schools is 4.8 to 1 (National Center for Education Statistics, 2003). Ninety percent of children aged 5–17 years use computers and 75% of 14–17 year olds use the Internet (National Telecommunications and

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Hybrid Online Education: Identifying Integration Models Using Adventure Learning

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Abstract

In this paper we sought to understand how teachers chose to integrate a hybrid online education program in their classrooms, how students responded to this choice, and how students' experiences were influenced by the integration model chosen by the teachers. Data collected via classroom observations, personal interviews, and focus groups suggest four integration models: curriculum-based, activities-based, standards-based, and media-based. We discuss these models in the context of hybrid online education and particularly in adventure learning. Finally, we provide recommendations for the design, development, implementation, and integration of hybrid online education programs. (Keywords: adventure learning, classroom technology integration, hybrid education, integration models, online learning environments.)

Alternative approaches to face-to-face education (namely hybrid and distance education), have been in existence since the late 1800s (McIsaac & Gunawardena, 2001; Moore & Kearsley, 2005) with these alternative approaches rapidly increasing in K–12 education (Smith, Clark, & Blomeyer, 2005). More recently, during the 2005–2006 academic year virtual K–12 schools served approximately 700,000 students in the United States (Picciano & Seaman, 2007). Even though the benefits of K–12 online and hybrid education have been delineated (Smith, Clark, & Blomeyer, 2005), the existing literature on online K–12 education, with a few exceptions, focuses on anecdotal accounts of technological resources that can be used by teachers to supplement face-to-face courses (Lombard, 2004; Martorella, 1997). Even more critical is the dearth of research in terms of how teachers actually integrate technology and online learning in their classrooms (Zhao, Pugh, Sheldon, & Byers, 2002).

INTEGRATING TECHNOLOGY IN THE CLASSROOM

For decades colleges of education in the United States have attempted to prepare preservice teachers to be able to integrate technology in their classrooms (Strudler & Wetzel, 1999). However, preservice teachers appear to be unsuccessful in effectively integrating technology in their courses and projects (Doering, Hughes, & Huffman, 2003; Ertmer 2005; Kovalik, 2003), utilizing technology superficially and in uncreative ways in what can be termed lower-level instructional methods (Hokanson & Hooper, 2004). Furthermore, inservice

ADVENTURE LEARNING
Educational, Social, and Technological Affordances for Collaborative Hybrid Distance Education

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Adventure learning (AL) is a hybrid distance education approach that provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative learning environments. Within hybrid environments, designers habitually attempt to replicate traditional classroom pedagogy resulting in experiences that do not support or afford meaningful collaboration and transformational learning. This article details the educational, social, and technological affordances for the effective design, implementation, and research of AL environments, providing insights for designers and researchers of hybrid online learning.

Ms. Anderson, a nineth grade social studies teacher, was teaching her favorite lesson on the Louvre museum. One of Ms. Anderson's most exciting days was when she took her class on a "virtual fieldtrip" to visit the Louvre and understand how it has progressed from a royal fortress to the museum it is today. Ms. Anderson developed an activity for her students to visit the Louvre Web site and "explore" the current and past exhibits. Her students progressed through the exhibits, viewed the numerous online photo galleries, and were excited to get started. After about 10 minutes, Jenna, a student in Ms. Anderson's class, raised her hand and asked, "What do we do now? Ms. Anderson replied, "This *is* the lesson."

Even with online learning growing in higher education (Lewis, Snow, Farris, & Levin, 1999) and K-12 environments (Davis & Roblyer, 2005; Setzer, Lewis, & Greene, 2005), the levels of implementation vary greatly from student to student, classroom to classroom, and district to district (Setzer et al.). Ms. Anderson's use of an online resource is typical in the social studies classroom—online lesson enhancements that augment individual face-to-face lessons (Doering, Hughes, & Scharber, 2007). However, as Jenna's comment reveals, students do not always perceive the connection to the bigger picture—the learning outcomes. They view their time on the Internet visiting a Web site as a disparate activ-

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"Timber for President": Adventure Learning and Motivation

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Adventure learning (AL) provides learners with opportunities to explore real-world issues through authentic learning experiences within collaborative online learning environments. This article reports on an AL program, designed using Keller's Attention, Relevance, Confidence, and Satisfaction (ACRS) motivational model of instructional design, which encompassed more than 3 million learners worldwide. The implementation of AL was examined through two experimental lenses: (a) how student motivation is related to student and teacher characteristics and (b) how student motivation is related to the ways in which the program was used within the classroom. Qualitative and quantitative measures were analyzed, including 21 teacher interviews and surveys of 228 respondents who used the online curriculum in 300 separate courses in grades K - 10 ranging from social studies to science to history courses.

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Understanding complex ecologies: an investigation of student experiences in adventure learning programs

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The GoNorth! Adventure Learning (AL) Series delivered educational programs about global climate change and sustainability from 2006 to 2010 via a hybrid-learning environment that included a curriculum designed with activities that worked in conjunction with the travels of Team GoNorth! as they dog sledded throughout the circumpolar Arctic. This study addresses a gap in the AL literature by identifying factors that lead to high levels of student engagement and reveals strategies for instructional designers and educators on how to design emotionally engaging online learning environments. A mixed methods study was conducted to explore patterns of learner engagement in relation to two AL programs: GoNorth! Fennoscandia 2008 and GoNorth! Nunavut 2009. Survey data were drawn from a total of 101 students in 2008 and 2009.

Keywords: adventure learning; emotional engagement; engagement; hybrid learning; instructional design; online learning environments

Introduction

In recent years, there has been a shift from a focus on usability to user experience in instructional design (Parrish, 2008). This evolving understanding of the significance of learner experience manifests itself in two major instructional design problems: designing emotionally engaging, aesthetically pleasing learning environments (Hokanson, Miller, & Hooper, 2007; Norman, 2004) and creating the right conditions for transformative and meaningful learning experiences (Doering, Reidel, Scharber, & Miller, 2010; Parrish, 2008). The solution to these design challenges can be considered ill-defined, as there are many interrelated factors that may impact such experiences. Some of these factors are pedagogical strategies, student motivation, and tools for collaboration and social interaction (Veletsianos & Doering, 2010).

One design framework that offers a method to engage learners with authentic content is adventure learning (AL) (Doering, 2006, 2007), which is defined as 'a hybrid distance education approach that provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative learning environments' (2006, p. 1). An example AL is the GoNorth! Adventure Learning (AL) Series, which delivered programs about global climate change and sustainability from 2006 to 2010. Specifically, this hybrid approach included a

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Field-based professional development of teachers engaged in distance education: experiences from the Arctic

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We examine the experiences of five teachers who traveled with a team of educators, scientists, and explorers on circumpolar Arctic expeditions to deliver adventure learning (AL) programs to K–12 students at a distance. Results highlight the personal and professional impacts this opportunity had on teachers, including their empowering, fulfilling, and mentally exhausting experiences while assisting in delivering distance education to students worldwide. The article concludes with a discussion of issues to consider in the development of similar programs.

Keywords: adventure learning; expedition field experiences; field experiences; K–12 online education; online distance education

Introduction

Teacher preparation programs worldwide place their students in schools during practicum experiences to experience firsthand the classroom environment, culture, and profession (McIntyre, Byrd, & Foxx, 1996). These experiences encompass a period of guided supervised teaching, providing students with relevant, valuable, and authentic professional development experiences (Beck & Kosnik, 2002). Unlike practicum experiences that focus on the process of becoming a teacher, expedition field experiences (EFEs) are opportunities provided to teachers to travel and/or work alongside practicing scientists, researchers, or explorers in real-world settings to gain experiences, skills, and content knowledge related to a topic of study. Although educators are often invited to join expedition-based projects and, among other duties, report their experiences, little research exists on the distance education aspects of participating teachers' experiences.

Our goal in this article is to understand the field experiences of teachers who participated in distance education programs delivered from the Arctic when positioned in the role of distance educators. Distance educators are increasingly embracing social and experiential aspects of education (Veletsianos, 2010), and teacher field experiences provide opportunities for educators to participate in and explore distance teaching through reflection and action (Baran, Correia, & Thompson, 2011). Yet, there is a dearth of literature on the topic. To examine these issues, we first review the literature on teacher field experiences and the programs that have

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EARTHDUCATION

The goal of Earthducation is to address the challenge set forth by the UN Decade of Education for Sustainable Development – to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. As such, the Earthducation team is traveling to climate hotspots on all the continents, documenting environmental issues and educational practices, and working together with a broad array of individuals and communities to create an ecological narrative of educational beliefs. Teachers, students, and the general public are expanding on and discussing these same issues in an online EnviroNetwork. The project team is documenting the communities they visit through photos, videos, and field reports, which are posted online while the team is in the field, along with background information and associated resources and activities for classrooms. To date, the team has visited 76 communities on 6 continents and conducted 243 formal interviews, with 438 posts by the general public to the Environetwork.

The entry that resonated with me the most was Earthducation. I was delighted to review this different type of designed approach, which fit well with the Living Principles Framework. I appreciated the thoughtful narrative, as well as the massive endeavor of documenting these explorations on education and sustainability around the world. As an educator, I believe this is the type of work schools need to embrace — a deep dive in reframing what sustainability education means in the 21st century. — Natacha Poggio, AIGA judge

Our biggest challenge in this new century is to take an idea that seems abstract — sustainable development — and turn it into a reality for all the world's people. — Kofi Annan, Former Secretary-General of the United Nations

2011: BURKINA FASO, AFRICA

In this small, landlocked, and impoverished nation where 80 percent of the population relies on subsistence agriculture, the community is facing 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 and 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, a small team pulked 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.

Learn more about Earthducation at http://earthducation.com

HOME

TAPESTRY

EDUCATORS

EXPEDITION

UPDATES

ABOUT

NORTH *of* SIXTY°

NORTH OF SIXTY°

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. This project is 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, pulking 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.

Designing for Learning Engagement in Remote Communities: Narratives from North of Sixty

Concevoir pour favoriser la participation active à l'apprentissage dans les communautés éloignées : récits d'Au nord du soixantième parallèle

Aaron Doering, University of Minnesota
Jeni Henrickson, University of Minnesota

Abstract

There are multiple challenges to designing learning experiences for schools in remote communities, including technology and infrastructure limitations, high teacher and administrator turnover, and conflicting interests between local culture and school curricula. In this paper, we offer a brief history of educational initiatives in remote Arctic communities, focusing on: 1) the importance of traditional knowledge, 2) the role of Indigenous culture in school learning materials and activities, and 3) how and why technology might be used to enhance and preserve traditional knowledge, language, and culture. We share implementation examples of one design model, adventure learning, that has successfully engaged learners worldwide in remote and urban communities alike. We conclude by presenting design principles for engaging learners in remote communities through a focus on reflective presence, interaction, educator support, and simplicity of design. These principles are illustrated with a narrative centered on the design of a new online learning environment titled North of Sixty°.

Résumé

Concevoir des expériences d'apprentissage pour les écoles de communautés éloignées comporte de multiples défis, relatifs notamment aux limites liées à la technologie et aux infrastructures, au haut taux de roulement des enseignants et administrateurs et aux intérêts conflictuels entre la culture locale et le programme scolaire. Dans cet article, nous offrons un bref historique des initiatives éducatives dans les communautés arctiques éloignées, en mettant l'accent sur : 1) l'importance du savoir traditionnel, 2) le rôle de la culture autochtone dans le matériel et les activités d'apprentissage scolaire, et 3) les raisons et les façons d'utiliser la technologie pour renforcer et préserver les connaissances, la langue et la culture traditionnelles. Nous partageons des exemples de mise en œuvre d'un modèle de conception, l'apprentissage par l'aventure, qui a réussi à faire activement participer des apprenants de partout au monde, tant dans les communautés éloignées qu'urbaines. Nous concluons en présentant des principes de design pour

la participation active des apprenants dans les communautés éloignées en mettant l'accent sur la présence réflective, l'interaction, le soutien à l'éducateur et la simplicité. Ces principes sont illustrés par un récit centré sur la conception d'un nouvel environnement d'apprentissage en ligne intitulé Au nord du soixantième parallèle.

Introduction

> In a society in which sharing and humility are often valued above individual wealth and personal achievement . . . it should be a given that the education system's pedagogy and curricula should strongly reinforce these values, rather than contradict them, as is too often the current practice. (Nunavut Tunngavik Incorporated, 2012, p. 4)

Throughout the world, remote communities face similar educational challenges related to schooling. These challenges include recruiting and retaining qualified teachers and administrators (Sharplin, O'Neill, & Chapman, 2011), conflicting interests between local culture and curricula and state/provincial/territorial/national educational directives (McClean, 1995; Nunavut Tunngavik Incorporated, 2012; Redwing Saunders & Hill, 2007), and limited access to the infrastructure, technologies, and resources found in many urban and suburban communities (Irvin, Hannum, de la Varre, Farmer, & Keane, 2012). Due to climate and difficult terrain, remote communities are many times accessible only by plane or boat, and are thus isolated from the outside world except via technology such as computers, radio, and/or television. Access to the Internet may be limited or unavailable, and when available is typically satellite-based, slow in speed, restricted in bandwidth, and expensive in cost. These communities may also be home to Indigenous populations on whom mandated, government-sponsored schooling was initially forced, with little to no input from the local community (Berger, 2009; McGregor, 2012).

The circumpolar Arctic is home to many such remote, Indigenous communities. It is also a region that is receiving increasing global attention due to climate change debates and the opening of new possibilities for natural resource extraction and global transportation routes. This increased attention brings its own set of unique challenges, including new threats to local culture, language, and traditional knowledge bases.

In this paper, we offer a brief overview of the history of educational initiatives in the Arctic, focusing on: 1) the importance of traditional knowledge, 2) the role of Indigenous culture in school learning materials and activities, and 3) how and why technology might be used to enhance and preserve traditional knowledge, language, and culture. We also share implementation examples of one design model, adventure learning (Doering, 2006), that has been successfully employed to engage learners and enhance learning outcomes worldwide, ranging from remote Arctic communities to inner city schools. The adventure learning (AL) approach is focused on designing and developing a hybrid learning environment that blends a predesigned curriculum with local culture using a combination of online and mobile technologies; field-based authentic narratives; multiple media artifacts; and scaffolds for teachers and learners alike. For clarity, we define curriculum as a set of learning materials and activities tied to specific learning objectives.

We conclude our paper with a set of suggested principles that elaborate on the topic of designing for engagement in remote communities through a focus on reflective presence, interaction, educator support, and simplicity of design. We emphasize the importance of reflective presence

in particular, and the need for pedagogies and platforms that advance self-representation and community engagement in online learning. These principles are illustrated with a narrative centered on the design of a new online learning environment and adventure learning expedition titled North of Sixty°. The North of Sixty° project is collaborating with schools in six remote communities around the circumpolar Arctic.

Read the full article at
http://cjlt.csj.ualberta.ca/index.php/cjlt/article/view/780

Learn more about North of Sixty at
http://n60.co

WEEXPLORE

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 inquiry-based 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 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

Visit WeExplore at http://we-explore.com

Fostering Creativity through Inquiry and Adventure in Informal Learning Environment Design

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Self-directed, inquiry-based learning opportunities focused on transdisciplinary real-world problem solving have been shown to foster creativity in learners. What tools might we provide classroom teachers to scaffold them and their students through this creative process? This study examines an online informal learning environment and the role the learning environment design and teacher pedagogy and practice played in influencing creativity in the classroom. Data were gathered via interviews, direct observation, and focus groups as 95 high school students guided by 1 teacher worked in small groups to collaboratively design and present geography research using the *WeExplore* adventure learning environment. Findings indicate that teacher and student creativity were impacted by the unique learning environment design, the opportunity to define self-identified driving questions, the process of collaborative group work, and the opportunity to combine more traditional research approaches with more creative arts-influenced ones.

INTRODUCTION

"The formulation of a problem is often more important than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle, requires imagination and marks real advance in science." Einstein and Infeld, 1938

How do we design informal learning environments (ILEs) that foster creativity among teachers and learners alike? What tools can we provide teachers that encourage learner curiosity and wonder, cultivate collaboration, and are scalable? These are common questions posed by teachers who engaged with global adventure learning (AL) programs (Doering, 2006) in their classrooms over the past decade. These AL programs successfully employed technology-fueled ILEs that rallied large numbers of teachers and learners online around transdisciplinary issues, leading teachers to ask how they might design and develop their own ILEs that foster innovative thinking on par with that generated within these large-scale AL environments.

In response, over the past two years the Learning Technologies Media Lab at the University of Minnesota designed and deployed a user-driven AL environment called *WeExplore* (http://we-explore.com). *WeExplore* provides an online and mobile environment that scaffolds teachers and learners through integrated, authentic learning experiences with real-world application, spurring them to take a collaborative, experiential approach to creatively solving driving questions they identify.

This study examines to what extent an ILE such as *WeExplore* might provide a technology-fueled classroom tool for teachers that fosters creativity while allowing learners to design authentic transdisciplinary experiences grounded in pressing contemporary issues. We also explore what role teacher pedagogy and practice might play in influencing learner creativity and engagement within an ILE. Findings show that teacher and student creative prowess was influenced by the unique design of the learning environment, the opportunity to define self-identified driving questions, the process of collaborative group work, and the opportunity to combine more traditional research approaches with more creative arts-influenced ones. We conclude with a model that reflects key criteria in learning environment design and teacher pedagogy relative to creative development.

CREATIVITY, EXPLORATION, AND WONDER

"Educators should give students opportunities to be creative and reflective within a real-world context and to use digital tools and resources in both face-to-face and virtual environments" ISTE, Standards for Teachers, 2014

Creativity is a hot topic not only in education but also in business today, as we face global challenges – such as climate change, aging infrastructures, social inequalities, and medical pandemics – that require novel thinking and technological innovation. Self-directed, inquiry-based learning opportunities focused on transdisciplinary real-world problem solving have been shown to foster creativity in learners (Esquivel, 1995; LaBanca & Ritchie, 2011; Liu & Lin, 2014; Mishra, Fahnoe, Henriksen, & the Deep-Play Research Group, 2013; Schmidt, 2010). Consensus on how to best define and assess creativity, however, has yet to be reached within the broader academic community (Parkhurst, 1999; Runco & Jaeger, 2012; Schmidt, 2010; Simonton, 2012). Most definitions include the criteria of *novelty* and *usefulness* or *effectiveness* or a variation of these terms, stressing that to be considered creative a product or solution must be unique but also serve a function or provide some value. Some scholars add a third criterion. For example, Simonton (2012) draws from the U.S. Patent Office criteria and includes *surprise* (nonobviousness) as a third criterion. Mishra and Koehler (2008) draw from Besemer and O'Quin (1999) and add *wholeness* (aesthetic sensibility). We believe these trifold perspectives provide a more contemporary and complete perspective of creativity than has been offered previously; they consider not only the practical nature of creative endeavors (novelty and effectiveness) but also the intangible elements: surprise, aesthetics, wonder.

Creativity may furthermore be examined from a personal standpoint versus a professional one (Parkhurst, 1999; Runco, 2003). Examining creativity from a personal standpoint involves looking at an individual's work or thought process and considering whether it reflects a divergent or novel approach relative to that individual's previous work, age, and developmental stage. Runco (2003) ties this type of creative insight to Piaget's (1973) concept of *invention*. In comparison, a professional standpoint reflects on the creativity of an individual's work or thought process relative to similar artifacts created by other individuals in a given field. Does, for example, an individual physicist's work represent a novel, unique, and nonobvious approach relative to other physicists?

We believe examining creativity from the personal standpoint makes the most sense in K-12 education, with an emphasis on fostering creative

development in learners and cultivating learner belief that creativity is not limited to artists and musicians, for example, or to certain gifted individuals, but is rather a way of uniquely perceiving the world and approaching problem solving that is possible by any individual in any field. Thus, how might we best spur learners to feel comfortable to approach problem solving and solution crafting from unique (creative) angles? How might we scaffold them to consider novelty, usefulness, and wonder in their thought processes, solution crafting, and learning artifacts?

In addition to considering a personal versus professional approach to creativity, creativity may be looked at as a process rather than assessed by a finished product (Runco, 2003), which is the approach we take in this study. That is, we are examining how the *WeExplore* ILE and the participating teacher's pedagogy facilitate creative thinking and development among learners, as well as how the learners themselves perceive creativity and its role in their classroom activities.

The influence of a teacher's pedagogy and personality on learner creativity has been well studied in the past (Anderson, 2002; Esquivel, 1995; de Souza Fleith, 2000; Horng, Hong, ChanLin, Chang, & Chu, 2005; Lee & Kemple, 2014; Liu & Lin, 2014; McGreevy, 1990; Reilly, Lilly, Bramwell, & Kronish, 2011; Rinkevich, 2011; Woods & Jeffrey, 1996). Teacher traits that have been shown to influence creative development in learners include flexibility, openness, and acceptance, and the ability to develop strong interpersonal relationships with students (Dacey, 1989; Esquivel, 1995; McGreevy, 1990; Reilly, Lilly, Bramwell, & Kronish, 2011). A survey of students about creative teachers by McGreevy (1990) found that teacher personality traits such as a sense of humor, spontaneity, understanding, and being able to share personal experiences with students tended to define creative teachers in students' eyes. Creative teaching has been associated with improved learner achievement and engagement (Rinkevich, 2011; Schacter, Thum, & Zifkin, 2006).

Considering a teacher's pedagogy in conjunction with the design of learning environments is an important component in investigating how we might engage learners in creative problem solving within the classroom setting. The teacher-participant in this study thus factors into our findings and recommendations regarding the design of informal learning environments that foster creative development.

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GEOTHENTIC

Never before in human history has it been more important for a person to be geographically literate. —Schell, Roth, & Mohan, 2013

GeoThentic is an online scaffolded learning environment that helps teachers integrate geospatial technologies in the K-12 classroom. The environment was built on the TPACK foundation and real-time feedback. Within GeoThentic, students are placed in the role of a geographer, working toward solving a geographic problem. The software creates opportunities for students to solve authentic, complex problems within an online environment, while concurrently providing teachers the TPACK foundation to be able to teach the multiple modules available within the environment.

The GeoThentic scaffolds (e.g., situated movies, screen-capture videos, and collaboration zones) have been designed to model, demonstrate, and provide feedback on the use of geospatial technologies while maintaining an appropriate level of difficulty and reducing unnecessary frustration. In lieu of requiring learners to use specific instructional materials, GeoThentic affords freedom to employ any of the scaffolds at any time.

Examples of modules in the GeoThentic environment:

Build a Hospital – Determine the best place in San Francisco to build a new hospital

Global Climate Change – Identify the top areas around the world most affected by climate change

Avian Flu – Identify the top locations around the world where humans are most impacted by Avian Flu

Population Density – Identify U.S. states that will be most impacted by population growth and decline by the year 2100

Build a Stadium – Identify the best city in the USA to create a new football team and build a new stadium
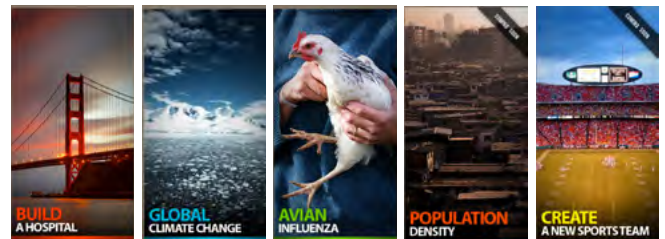
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GeoThentic: Designing and Assessing With Technology, Pedagogy, and Content Knowledge

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University of Minnesota

George Veletsianos
University of Manchester

Abstract

GeoThentic, an online teaching and learning environment, focuses on engaging teachers and learners in solving real-world geography problems through use of geospatial technologies. The design of GeoThentic is grounded on the technology, pedagogy, and content knowledge (TPACK) framework as a metacognitive tool. This paper describes how the TPACK framework has informed the authors' design endeavors and how a set of assessment models within GeoThentic can be used to assess teachers' TPACK.

Geospatial technologies such as global positioning systems and geographic information systems infiltrate many people's daily lives – General Motor's OnStar, Apple's iPhone, Yahoo and Google maps, and the meteorological maps that display the local weather forecast are just a few. Due to the influx of new technology and the roles of these technologies in the world, many scholars in the fields of educational technology and teacher education have called for increased and meaningful integration of technology in schools and classrooms. Specifically, many social studies researchers have noted the potential for using geospatial technologies in order to increase student motivation and engagement (e.g., Heafner, 2004; Keiper, 1999), although actual integration has fallen short of expectations (Doering, Veletsianos, & Scharber, 2008; Whitworth & Berson, 2003).

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SAMPLE VIDEOS FROM THE FIELD

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Earthducation Expedition 1: Burkina Faso Update
Retrieved from https://vimeo.com/36727448

University of Minnesota Driven to Discover
Commercial featuring Doering
Retrieved from https://vimeo.com/6814288
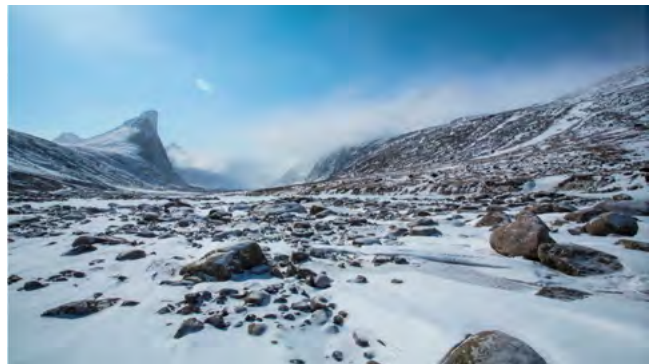
North of Sixty Arctic Voices Update
Retrieved from https://vimeo.com/64767616

Earthducation Expedition 3: Australia Update
Retrieved from https://vimeo.com/49783560

GoNorth! Education Day Video
Retrieved from https://vimeo.com/6809020

ABBREVIATED CURRICULUM VITAE

AARON H. DOERING

IDENTIFYING INFORMATION

Academic Rank

Professor, Learning Technologies, Department of Curriculum and Instruction

Education

Degree	Institution	Date Degree Granted
Ph.D.	University of Minnesota Major: Curriculum and Instruction (Instructional Systems and Technology) Minor: Social Studies Education Advisor: Simon Hooper	2003
M.S.	Mankato State University Major: Geography	1995
B.S.	Moorhead State University Major: Social Studies Education Minor: Sociology	1993

Positions/Employment

University of Minnesota, Twin Cities Campus (2001 – present)

Director, Learning Technologies Media Lab	Jun 2014 – present
Co-Director, Learning Technologies Media Lab	Jan 2010 – present
Professor, Curriculum and Instruction	May 2015 – present
Associate Professor, Curriculum and Instruction	Jun 2009 – present
Assistant Professor, Curriculum and Instruction	Sep 2005 – Jun 2009
Lecturer, Curriculum and Instruction	Jun 2003 – Sep 2005
Teaching Specialist, Curriculum and Instruction	Jan 2001 – Jun 2003

Other Professional Employment

Co-Director, Minnesota Alliance for Geographic Education St. Paul, MN	Jan 2010 – present
Educational Technology Staff Geography Awareness Workshops Geography Education Outreach Program National Geographic Society, Washington, DC	Jun 1996 – Sep 2002
Social Studies Instructor, Century High School Rochester Public Schools, Rochester, MN	Sep 1997 – Dec 2000
Social Studies Instructor, Kellogg Middle School Rochester Public Schools, Rochester, MN	Sep 1995 – Aug 1997
Adjunct Instructor, Education Department Mankato State University, Mankato, MN	Sep 1995 – Jun 1998
Adjunct Instructor, Geography Department Mankato State University, Mankato, MN	Sep 1995 – Jun 1998

Delegation Leader/Instructor, People to People	Jun 1995 – Aug 2000
Rochester Public Schools, Rochester, MN	

HONORS AND AWARDS

University of Minnesota

Marty and Jack Rossman Award College of Education and Human Development	2012
Community and Outreach Engagement Faculty Award College of Education and Human Development	2011
Bonnie Westby-Huebner Endowed Chair of Education and Technology	2008 – present
Institute on the Environment Resident Fellow	2010 – present

External Sources

Journal of Geography "Best Article for Program Development" Award from the National Council for Geographic Education (NCGE)	2015
Royal Canadian Geographical Society Fellow	2014
Journal of Sustainability Education SNAP Award, RESTORE Category for the North of Sixty project	2014
Invited visiting professor Charles Sturt University, Wagga Wagga, Australia	2013
AIGA Judge's Choice (Re)Design Award for the Earthducation project Minneapolis, MN	2013
AIGA (Re)Design Award for the North of Sixty project Minneapolis, MN	2013
Named as a Top Innovator by The Science Coalition	2012
Outstanding Paper Award for *Designing with and for Technological Pedagogical Content Knowledge:* *The evolution of GeoThentic* (Doering, A., Miller, C., & Scharber, C.) TPACK SIG Society for Information Technology and Teacher Education	2011
Minnesota TEKNE Award for the GoNorth! Adventure Learning Series Minneapolis, MN	2010
SIGtel Online Learning Award for the GoNorth! Adventure Learning Series National Educational Computing Conference, Washington DC	2009
Design and Development Showcase Finalist for Geothentic Association for Educational Communication and Technology Anaheim, CA	2008
Laureate, Tech Awards: Technology Benefitting Humanity San Jose, California	2008
Design and Development Showcase 2nd Place Award for GoNorth Adventure Learning Association for Educational Communication and Technology Anaheim, CA	2007

| University Young Alumni Award | 2006 |
| Minnesota State University-Mankato | |

| College of Social and Behavioral Science Alumni Award | 2006 |
| Minnesota State University-Mankato | |

| National Council for Geographic Education Dissertation Award for | 2003 |
| *GIS in Education: An Examination of Pedagogy* | |

SELECT PUBLICATIONS AND MEDIA APPEARANCES

Books

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THE POWER OF ADVENTURE LEARNING

'**Real-world issues**
in real-time are motivating learners to get involved. '

' It's the **power of the story**
that engages us. '

'**Community**
is built at the point where our stories intersect.'

'**Transformational learning**
is not based on age, race, or wealth, it is about
placing opportunities in the hands of learners. '