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Mark Larese-Casanova
Utah State University

Jennifer Perkins
Utah State University

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From Outside to Online: Unanticipated Directions for Utah Master Naturalist

*By Mark Larese-Casanova and Jennifer Perkins
Utah State University*

Abstract

Utah Master Naturalist is an award-winning Utah State University Extension program that promotes stewardship of Utah's natural world through place-based, experiential field courses across the state. Although successful in eliciting positive short- and long-term impacts, Utah Master Naturalist's traditional five-day field courses were unavailable to many students and instructors due to constraints of time and location. This case study examines Utah Master Naturalist's first hybrid course, Desert Explorations, and describes the positive results from our pilot study, how a hybrid course solves accessibility issues, and how field-based learning theories can be adapted to online education through careful design.

Environmental education is most successful when students engage with nature in experiential, place-based learning that develops their scientific understanding and connection to the natural world. For ten years, Utah Master Naturalist (UMN), a Utah State University Extension program, has successfully engaged adult students in science-based field courses using experiential, place-based education. While we recognize UMN's successes, we are aware that its place-based design has inherent accessibility issues. As a result, we have developed hybrid courses based on UMN's successful field course model. The first hybrid course, Desert Explorations, serves as a case study, demonstrating how a hybrid course design solves accessibility issues while teaching effective environmental education.

Traditional five-day field courses

The mission of UMN is to develop well-informed citizens who provide education, outreach, and service, promoting stewardship of natural resources within their communities. Traditionally, Utah’s major biomes—watersheds, deserts, and mountains—have been the focus of five-day field courses entitled: Watershed Investigations, Desert Explorations, and Mountain Adventures. Field courses have been delivered across Utah, with the focus of immersing students in nature.

The geographic locations of UMN field courses have ranged as far north as Logan to as far south as Kanab. In addition to providing lecture-style teaching, expert instructors have facilitated learning by guiding students on outdoor adventures, such as exploring, hiking, canoeing, and camping, encouraging them to share their own knowledge with the group. This place-based, field-learning approach successfully created a community of inquiry as students connected, both kinesthetically and experientially, with natural environments in a learning vacation atmosphere.

A variety of students have participated in UMN field courses, often in conjunction with volunteer or professional work at schools or nature organizations. Approximately 21% of past participants have been Utah K-12 teachers, 18% environmental educators, and 61% volunteer or amateur naturalists. Students who participated in five-day field courses demonstrated a persistent connection to nature and a commitment to improving Utah’s natural world and the issues facing it. They felt courses were “fun and informative,” that the learning community was “interested and interesting to be with,” and that afterward, they felt “a much deeper understanding and appreciation for our natural places” (Larese-Casanova, 2011; Larese-Casanova, 2015; Larese-Casanova, 2018).

Limitations of traditional five-day field course delivery

Although highly successful in its mission to promote stewardship of Utah’s natural world, traditional UMN courses remained inaccessible to many students and instructors because of time and location constraints. Rural Utah students were underserved and unreachable because field course attendance required costly travel and time investments. Additionally, K-12 educators who could enroll for professional

development were limited to attending only summer field courses. Over the years, several people expressed interest in attending a field course, but were unable to take five or more days off from their work.

As program developer and director, the lead author has taught the vast majority of UMN field courses, either entirely or in cooperation with partners. Traveling to remote, rural locations required more time and funding, with less guarantee that field courses would fill with students. As UMN sought more instructors from partner organizations, constraints of time, finances, or training limited the pool of knowledgeable instructors who were able to teach five-day field courses. It became clear that we needed to adapt UMN course delivery to provide educational access to a larger and broader audience and to increase the outputs of the UMN program overall.

Benefits of online education

Asynchronous online education (OE) is an established, effective method of delivering programs that complement and substitute for in-person instruction; however, it is a relatively new concept for the delivery of Extension environmental programs (Jeanette & Meyer, 2002; Kaslon, Lodl, & Greve, 2005; Langellotto-Rhodaback, 2010). Often eliminating constraints of location and time, OE attracts fulltime, employed students who are otherwise unable to attend in-person courses (Boettcher & Conrad, 1999; Dromgoole & Boleman, 2006). Because of the self-directed, free-time learning potential of asynchronous OE, we confirmed that a hybrid course design could solve student and instructor accessibility issues and grow UMN (Halsne & Gatta, 2002; VanDerZanden, Rost, & Eckel, 2002).

Asynchronous OE also has the potential to help UMN reach entirely new audiences, such as tourists. Utah's vibrant eco-tourism industry attracts visitors from across the United States and other countries (Leaver, 2016). Each online portion of UMN's hybrid courses could benefit tourism visitors looking to better understand Utah's natural resources prior to their visit (Green, 2012; Langellotto-Rhodaback, 2010). In the past three years, four UMN students have traveled to Utah from other states (i.e., Maryland, New York, and California) specifically to attend a UMN field course as a learning vacation. Developing a greater awareness, understanding, and

need for stewardship of Utah's diverse ecology prior to visiting would certainly enhance the tourist experience and expand UMN's reach.

Replicating Essential Field Course Components Online

While it may seem counterintuitive to convert successful field courses into hybrid courses, we chose a hybrid course design consisting of a ten-hour online course and three-day field course. The basic desert concepts that were usually taught in a classroom-type setting during the field course were extracted and used to create the new online course. We developed the online portion of Desert Explorations using the following online best practices, while incorporating the experiential, place-based, constructivist learning theories that made traditional UMN field courses so successful.

Set clear goals and objectives: Since online students benefit from having explicit course objectives, we selected clear, attainable objectives from the UMN Desert Explorations field course to guide online course design and management (Boettcher & Conrad, 2016). Using the objectives as a roadmap to learning, we directed UMN online students to review the objectives and identify familiar and unfamiliar topics that they could discuss in an introductory discussion forum. This served as a pre-assessment of each student, conveying their level of prior knowledge while identifying course expectations (Fish & Wickersham, 2009).

Create an easy-to-navigate, effective design: Most UMN students are members of the general public. We anticipated they would have limited experience with the Canvas learning management system in which the course is designed. Therefore, we designed the layout and function of the course to be similar to an interactive website. The homepage of Desert Explorations depicts the nine module topics as image links to each module, with the module title appearing when hovered over (Figure 1).

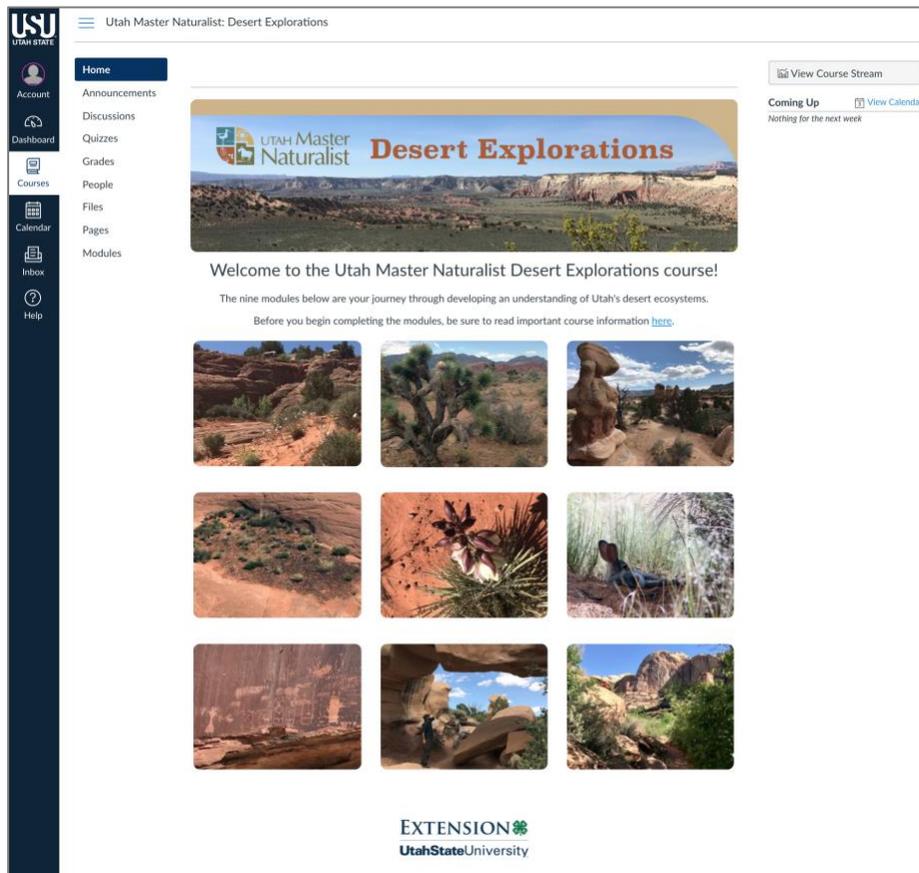


Figure 1. Homepage of the Utah Master Naturalist Desert Explorations online course.

The nine course modules focus on the fundamental concepts related to the main topics and objectives of the Desert Explorations course manual:

1. *Discover Deserts*: Understand what a desert is, how they are influenced by climate, and where deserts are found across the world.
2. *Identify Desert Regions*: Know the different desert regions in Utah and their primary geologic and ecological characteristics.
3. *Understand Desert Geology*: Explore the geologic layers and processes that create the iconic Utah desert landscapes.
4. *Explore Desert Communities*: Study the structure, composition, and ecology of the diverse desert communities from biological soil crust to the pinyon-juniper woodlands.

5. *Recognize Desert Plants*: Recognize the adaptations that desert plants use to survive in a harsh environment.
6. *Notice Desert Animals*: Understand the animal adaptations required for living in desert environments.
7. *Investigate Human History*: Travel through time, exploring the role of ancient and modern peoples and how they interacted with Utah's desert ecosystems.
8. *Become a Desert Naturalist*: Hear the perspectives of renowned naturalists and develop skills of observation.
9. *Explore Utah's Deserts*: Visit Utah's State and National Parks and Monuments, and join UMN on a Desert Explorations field course.

Each of the nine module topics were organized into steps to help students progress through the stages of Bloom's revised taxonomy of learning, as they remember, understand, apply, analyze, evaluate, and create their desert knowledge (Anderson, et al., 2001). These steps include sections where students are asked to *explore, understand, connect, reflect, and expand* upon a desert topic. Each step, described below, incorporates multiple learning theories, such as social learning theory, constructivism theory, the theory of emotional intelligence, experiential learning, cognitive apprenticeship, and situated learning theory (Bandura & Walters, 1977; Bruner, 2009; Golman, 1995; Dewey, 1997; Collins, Brown, & Holum, 1991; Lave, 1991; Boettcher & Conrad, 2016).

- *Explore*: Students explore the module topic by reading a summative paragraph.
- *Understand*: Students understand the topic by reading page selections from the UMN Desert Explorations course manual, watching video content or PowerPoint presentations, and listening to short audio segments such as podcasts. When students learn outdoors in a field course, they typically use all their senses and powers of observation to apply concepts. In the online course, we provided students the choice to read, watch, and listen, simulating the varied field-learning choices that construct meaning.
- *Connect*: Students connect with the module topic as they engage in one discussion and one activity. The discussion contains a thought-provoking prompt led by the instructor, mirroring typical field course discussions. Each discussion and activity engages the instructor and participants in a

community of inquiry, where learning theories such as social learning theory, the theory of emotional intelligence, and constructivism are built into the prompts and consequent discussions (Stewart, 2017).

- *Reflect*: Students have an opportunity to reflect on the information they have learned in the module topic, discussion, and activity by completing a low-stakes quiz. The quizzes provide feedback on each student's progress and help tailor the activities in the subsequent three-day field course.
- *Expand*: Students are offered additional extended learning resources to expand their knowledge by reading, watching, listening, or doing. This choice models constructivist theory as students choose to further their learning outside the course and its expectations.
- *Develop a community of learners*: Each online discussion and activity connects everyone with each other in a community of learning. Each cohort of online students and their community of inquiry will eventually transition into a three-day field course. When students and the instructor meet in-person, they have an established relationship and can construct new learning based on past interaction (Stewart, 2017)
- *Use a variety of resources to enhance learning*: UMN students are not a captive audience like undergraduate college students, and many do not even request USU credit for completing a course. As a result, we needed to use techniques and resources to maintain attention and engagement. Incorporating content from multiple sources, including UMN, National Park Service, and Utah Public Radio, helped create an environment where students could learn from multiple reputable sources in different delivery styles (Ally, 2004).
- *Evaluate for improvement*: The efficacy and impacts of the UMN online courses are measured through continual evaluation that guides improvement. Incorporating quizzes into each learning module helps us assess each student's knowledge and evaluate the effectiveness of the course content and delivery. The Desert Explorations online course culminates with an evaluation survey that requests feedback related to the effectiveness of the course format, the Canvas interface, course content, and user experience and learning. The survey content was tied directly to the course objectives, as well as goals related to the essential UMN course components described above. The survey also asked for open-ended

feedback about course functionality. Improvements to the UMN Desert Explorations online course were guided by the student feedback (Boettcher & Conrad, 2016).

Piloting results

We partnered with the Natural History Museum of Utah to offer three UMN field courses as professional development workshops for K-12 teachers in 2017-2018. This provided an opportunity to pilot the Desert Explorations online course with an ideal audience of trained educators who are accustomed to online professional development. We began in October 2017, combining the new Desert Explorations online course with a three-day field course held at the University of Utah's Bonderman Field Station near Moab. These 18 students were given access to the online course two weeks prior to the start of the field course, so that they could develop a baseline knowledge about desert ecosystems.

Evaluation results conveyed that the Desert Explorations online course successfully created an effective community of inquiry and largely replicated the essential components of the UMN field course in its new asynchronous online medium. Feedback from the students indicated that they found the format and content highly effective in teaching the fundamental concepts of the Desert Explorations course. When asked what they liked most about the course, the majority of the students surveyed responded with positive affirmations about the multiple learning styles and multiple forms of media that they engaged with in the *understand* and *connect* sections of each module. The students also found the activities and discussions helpful in encouraging interaction among the group. Activities were especially useful in reinforcing concepts through experiential, place-based learning in their local environments. Some students even enjoyed the assessment quizzes because they held them accountable in learning and understanding the course content.

Suggestions from these pilot students guided improvements to the online course for future cohorts. To improve functionality, we replaced the original introductory homepage with the module page now seen in Figure 1. As recommended, we plan to open each online course at least one month prior to the complementary field course, as several students felt rushed to finish the online course within the two-week timeframe. While some students thought the activities were too lengthy, others

suggested that we include more. With this assessment, we kept the amount and type of activities as they were originally developed, but we plan to continue evaluating their effectiveness. In the future, instructors will have greater involvement in each module's discussions and activity forums to promote higher levels of engagement and learning among the participants.

Conclusions

Creating a hybrid UMN course was effective in maintaining the program mission and achieving our educational goals. Students developed a greater awareness and understanding of Utah's desert ecosystems through experiential, place-based learning both in an online asynchronous learning medium and a shortened three-day field course. We are using the knowledge and experience gained through the development, piloting, and improvement of the Desert Explorations online course as we create the two remaining UMN online courses that will be piloted in 2018. We anticipate that the success of transitioning to a hybrid UMN Desert Explorations course will help us resolve instructor and student accessibility issues while achieving our goal of increasing participant involvement and program output over time.

Hybrid courses have a great potential to increase accessibility to educational resources while maintaining an impactful educational experience. The online portion of a hybrid course is accessible to anyone with a computer or smartphone, and the in-person portion provides essential opportunities to interact with instructors and peers in a classroom or field setting. A hybrid model makes the most efficient use of instructors' and students' time and resources and ensures greater accessibility to educational opportunities.

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