Engaging Learners through Interactive Field Experiences

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Abstract

Education has experienced a recent shift in focus to strategies and methodologies centered around rapid deployment and accessible content. In response to the impacts of a global pandemic, there has been a significant transition from in-person content to virtual activities. While these online applications and virtual technologies are essential for our evolving education systems, an emphasis on application and experience is essential for knowledge transmission and transferable skills. This investigation focuses on renewing opportunities for small groups of students to engage in field experiences in science field courses while maintaining the requirements of social distancing to ensure safe and healthy interaction among students in an outdoor environment. One key strategy for strengthening scientific practice is by developing a curriculum that includes real-world life experience and field activities. These strategies add the necessary components of engagement and hands-on activities to increase meaning and relevancy to our virtual and hybrid world. Examples will be shared from a summer field experience that has been carefully designed to expand collaborative learning in the biological sciences.

Keywords: *Active Learning, Field Research, Life Science, Transferable Skills.*

1. Introduction

Field experience can be an integral tool in the life sciences to help teach, guide, and instruct through experiential learning, practice, and application. In this paper, we will review the successes and challenges of experiential learning using the example of a field-based biology course. This class is focused on opportunities for small groups of students to engage in field experiences in science. The overall objective of this field course is to provide students practical biological experience in temperate ecological communities of the Southeastern United States, however, the broader implications of these active learning techniques can be applied to a wide range of disciplines within the life sciences. Recent changes to curriculum delivery mechanisms have promoted a more remote and independent model, but in this paper, we emphasize renewing our commitment to sharing cutting-edge experiences that lead to quality experiences and student success. A key component of these endeavors is developing and utilizing state-of-the-art creative coursework while incorporating outstanding research and methods to reach and motivate students.

2. Review of the literature

Applied learning and field experience have the power to dramatically increase opportunities for learning by including outdoor experiences and innovative strategies and techniques for engaged, active learning. Field research and excursions provide a unique and integrated “learn-how-to-learn” experience that cannot be duplicated in the classroom or laboratory [1]. These unique experiences create opportunities for first-hand experiences that encourage critical thinking, long-term retention, transfer potential, positive attitudes toward science, appreciation for nature, and increased scientific curiosity [2]. Applied learning is a practical approach that is supported by research to increase student motivation, foster student-centered instruction, and provide real-world application. It is also an opportunity for high-impact learning, where students explore content and directly apply new knowledge [3]. It is crucial to support an exemplary curriculum, capturing and sharing cutting-edge experiences that lead to quality courses and student success. Essential field opportunities provide hands-on, collaborative learning that is essential in the science field, but with some creative inginuity to develop active learning projects, these strategies can be applied to other disciplines as well.

3. Need for expanded offerings in experiential learning

Creating a course that breaks from the traditional lecture-based classroom and is, instead, rooted in experience, skillset development, and reality is essential for young learners. Fleischener and colleagues [4] said it best when they stated that experiential learning has the ability to, “transform

abstract concepts into tangible reality." This learning style or apprenticeship model of learn-by-doing dominated early education, but has since lost favor in the wake of modern convience. Authentic and experiential learning has been shown to improve scientific literacy and improve positive attitudes towards the sciences [5]. Discovery-based science enables real-world observational and experiential data collection. Full immersion into the subject of study can result in life-changing realizations or epiphany moments for students in terms of choice of future study or chosen career trajectories. Most students prefer this practice-based approach to learning cooperatively with their peers and have more fun with this style of learning-by-doing. These types of experiences can also cement teacher-student relationships and reinforce peer bonds. While institutional support can be difficult to secure for this educational framework, this type of course design will often lead to beneficial public relations and promotional opportunities and increased retention for instructional programming.

4. Challenges

With the current challenges of our modern-day world, quality field-based training has become difficult to find. Providing practice through application requires faculty and instructors that have extensive life experience. Offering field-based courses requires a significant commitment of time and funding resources. Institutional operations are designed to minimize the potential exposure to liabilty. Project-based learning and hands-on activities of this kind require a smaller teacher-to-student ratio and can demand greater time commitments. This greater demand of resources can translate to logistical challenges and the need for additional resources. However, this commitment to experiential training can be particularly relevant in the biological sciences [4] and is relevant for the broad spectrum of life sciences.

5. Example course description and overview

Temperate Biology is an example of a class designed entirely around providing students with real-world experience and practice in field techniques and application. It is a course aimed at helping students develop a cultural and ecological understanding of the botanic and zoologic composition and dynamics of the focal region. This course combines the use of lecture and field experiences to familiarize students with the ecological relationships present in the focal region. The course includes 60 hours of instruction that is the same as a traditional four-credit college course, but relies on a travel component to visit the areas of study.

The innovative curriculum provides the opportunity for students to visit and study a range of landscapes and physiographic provinces in the state of Georgia to explore the landscape's natural history and ecology, the natural communities within these regions, and the unique endemic species that call these natural communities home. In each of these areas, students collect artifacts and complete hands-on investigations of the environment. Students engaged in this curriculum learn about community landscape ecology and plant and animal taxonomy. In addition, students learn about conservation and landscape management techniques. As part of this experience, they interview professionals in the field and discuss potential career trajectories. Students also compile a final portfolio to present and catalog biological data, document habitats, and summarize and reflect on each field experience. These intense, connected and cooperative activities culminate with field collections resulting in a final presentation of the accomplishments and endeavors.

In recent exit interviews with students from our Environmental Science and Biology Programs, when asked about the most valuable experiences and courses of their degree program, three out of three interviewed course participants mentioned that they found the class to be a seminal part of their educational development. These students mentioned that the field course gave them experience they could use in future carrers and the exposure they needed to direct future areas of study or select a professional focus. They also mentioned that the collaborative spirit and fun activities undertaken during the course made it one of the highlights of their edcuational career.

6. Conclusions and future recommendations

Recent worldwide events can be seen as an opportunity for expanding approaches to teaching to a wider range of non-traditional platforms and embracing experiential learning. Sharing the advantages of field experiences can provide a framework for educators to expand collaborative fieldwork strategies that support their traditional curriculum, and increase the interrelatedness of innovative learning objectives patterned after the methodologies aligned to this type of field experience. It is essential to develop innovative opportunities to engage students through hands-on practice to stimulate learning and ensure that active learning is taking place. Intriguing field experiences for

students are emerging every day leading to an educational culture in the sciences that encourages active engagement and strengthens student performance. Further ongoing study is needed to focus on the variety of inquiry-based field experiences and practical biological applied opportunities that will lead to engagement incorporating demonstrative or investigative techniques and learning.

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