Using Citizen Science in Wildlife and Ecology Education

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Introduction

New and innovative uses for technology continue to be explored in and outside the agricultural science classroom (Webb, Bunch & Wallace, 2015). As teachers look for ways to keep students excited about learning, we need to take advantage today's students and how they embrace technology. One such way is using citizen science data collection techniques (Prudic et al., 2018) like the iNatrualist app. Citizen science involves research projects that encourage the general public to participate in meaningful, real-world data collection and information sharing (Herbling & Isaac, 2018). Citizen science is the collection and contribution of scientific data by the general public. It is emerging as a method to collect large amounts of biodiversity data quickly, especially within urban areas. This approach has been shown to expand biodiversity research by building on a tradition of volunteerism and public engagement (Theobald et al., 2015; Burgess et al., 2017).

This type of learning system is comprised of teacher, students and a global learning community. This approach provides students with instant access to information through the global learning community. It also gives teachers and students a relevance and personalization of the learning process. Using this approach allows students to have ownership of what they are learning and lets teachers be facilitators of the learning process.

How It Works

As part of a wildlife workshop, undergraduate pre-service teachers and current teachers were tasked with the collection of plant and insect specimens for their wildlife courses and for training the [STATE] wildlife CDE. They were given the plant and insect list for the CDE and tasked with collection during the first day of the workshop. To assist their collection, participants were instructed on the use and asked to download the iNaturalist app to their smartphones. This instruction on use of the app took place while driving to the collection site. After collection, they gathered as a group in a classroom setting to pin their insects, key & press their plant collection. It was during this time that comparisons were made between what they found and what was identified using the iNaturalist app.

With iNaturalist, a joint initiative of the California Academy of Sciences and the National Geographic Society, participants take pictures of naturally occurring organisms (such as insects, plants and animals), and upload the images to iNaturalist, where a global community of naturalists crowdsource to help identify the organism. Recent advances in the platform include using artificial intelligence technology to help identify plant and animal images down to the species level. Users record biodiversity observations, including date, time, location, taxonomic id and images., which in turn is labeled as an "observation". Shared observations help scientists and society learn more about life on Earth and enable a global study of biodiversity over time. Benefits of this app include the permanent integration of field images and an array of metadata linked to the individual data collected.

Participants were instructed to continue the use of the app on their home campus, comparing and comparing observations to validate what they found. Using this format, they can add to the collection with geographical inputs, images and other data that may be used by similar users. Concepts learned from this workshop were then used when teachers returned to the high school classroom as lessons to their students about citizen science projects, ecology and wildlife conservation.

Results to Date

The first of these workshops took place late Spring 2019, and was well received by participants. Since the workshop, current teachers who attended have implemented the use of iNaturalist and citizen science techniques in their classroom. One of the participants has embraced using citizen science-based projects with his plant ID and landscape CDE teams. Teachers have expressed interest in learning more about such techniques. Several of the participants will be presenting what they have learned through using citizen science and the use of iNaturalist in and the classroom at the [STATE] teachers conference late Summer ’19. Pre-service teachers who took part in the workshop have since used what they learned as an example of technology integration during their university curriculum and instruction courses. Using iNaturalist and introducing workshop participants to citizen science techniques will be continued in future workshops over the next three years of this grant project.

Advice to Others

As mentioned previously in the abstract, we taught participants how to use iNaturalist while traveling on buses to the collection site. It is advised that future instruction use a more formal learning environment so people can ask questions and get quality instruction before using. We will be implementing this into the wildlife training workshop. Additional instruction and examples of citizen science should be used to help explain these concepts. Providing examples of class projects will help participants be more likely to implement them once leaving the training.

I recommend having a couple of pre-identified samples that participants can take their first “observations” from in the classroom before going to the field. This will allow them to see how the system works, discuss how this applies to citizen science data collection and ask any questions before use in the field. A solid WiFi or data connection is needed if participants need immediate feedback through the iNaturalist app. All pictures can be taken and uploaded at a later time if such resources are not immediately available.

Costs

iNaturalist is a free resource downloaded as a mobile app or used through www.inaturalist.com. This innovative idea was just one part of a USDA-NIFA (2018-0525) funded grant project titled *Wildlife Education & Sustainability Training*.

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