**Spring 2021 Master’s Theses**

Citizen Science to Improve Science Self -Efficacy in Undergraduate Non-Major Community College Students in an Online Learning Environment

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**Abstract**

Citizen science is a way for non-scientists, such as the general public, to participate in real scientific research with scientists. While not new, the number of opportunities and ease of access to citizen science participation has expanded with the invention of new technologies and increased accessibility to the internet. Citizen science may therefore be a way to offer an opportunity for undergraduate, non-science major students, enrolled in an online science course, to participate in scientific research and thereby increase their confidence in their ability to do science. In this study, 40 undergraduate students enrolled in an online general science non-major’s course at a community college participated in citizen science projects of their choice using the platform Zooniverse. Using pre and post surveys, the study investigated the effects of participation in the citizen science projects on students’ science self-efficacy, connection to science, and science anxiety scales. In addition, student’s attitudes concerning the perceived value of the citizen science projects was measured. Pair t-tests were used to compare pre and post results from the surveys. It was found that the students had a significant increase in self-efficacy and that traditional students (17-22 years old) showed a greater increase than the nontraditional students (25 years old and older). Science anxiety decreased slightly in the traditional students but did not change for the nontraditional students. Overall the connection to science did improve significantly. Seventy-five percent of the students indicated that they planned to continue to do the citizen science projects outside of class. Students remarked that the citizen science projects made them feel like a scientist and that they were contributing to science. The citizen science projects chosen by these non-major science students did get them involved and excited about science. It is recommended that citizen science projects be used in online undergraduate courses, especially with non-science majors to support them in viewing science as a part of their everyday lives.

*Keywords:* non-major, citizen science, community college, self-efficacy

Woodpeckers as Bioindicators of Avian Biodiversity on a Southeastern University Campus

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**Abstract**

Anthropogenic change leads to habitat fragmentation and habitat loss impacting forest birds. Woodpeckers are a good bioindicator of a healthy forest ecosystem. They require forested habitat that has plenty of shelter, roosting and nesting sites, snags, vegetation, and insects. Examining woodpecker habitats and behavior in close proximity to human activity can inform preservation efforts. We aimed to evaluate the University of North Carolina at Pembroke (UNCP) campus, located in the southeastern part of the US, for woodpecker diversity along an urban agricultural gradient. We split the campus into two study sites of 17ha each and conducted weekly walking surveys during which we mapped woodpecker locations and behaviors. Forested areas within the north site totaled 11ha while forested area in the south site total 1.6ha. The data showed that UNCP supports a diverse population of woodpecker species establishing their own territories. We found that the *Melanerpes carolinus* (Red-bellied Woodpeckers), *Dryobates pubescens* (Downy Woodpecker), *Colaptes auratus* (Northern Flicker), each established territory on and around the campus. Forested areas covered 64.7% of the northern site, while only 8.9% of the southern site was forested areas. Using ANOVAs and comparing tree basal area between the two sites we found that tree species composition did not differ between the two sites. To indicate if both sites supported biodiversity of avian species we calculated the Shannon Index to determine species evenness and we found that both sites supported biodiverse communities of avian species. We compared the woodpecker species richness, date, forest coverage, and total species richness. We found that the woodpecker species richness and date were significant factors in determining avian biodiversity. Our evidence illustrates how important it is for universities to be aware of and carefully plan their green spaces by making sure to provide areas or patches with tree coverage that are easily accessible to different species of woodpeckers, which in turn will indicate the diversity of avian species around campus.

*Keywords:* woodpeckers, agriculture, University campus, biodiversity, birds