Exploring Citizen Science in the Classroom: An Assessment of Undergraduate Classification Accuracy in a Ranch Management Course

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Introduction

- Citizen (community) science platforms have become a crucial aspect of involving the public in scientific research. The Zooniverse platform has particularly grown to include a wide range of participants in the scientific community.
- Verifying the accuracy and reliability of citizen science efforts is important and has been achieved through various approaches (Baker et. al, 2021; Rosenthal et al., 2018; Swanson et al., 2016).
- Though there is a substantial amount of literature surrounding the reliability of community science platforms, relatively few studies tackle applications in undergraduate education.

Objectives

Documenting the accuracy of student classifications and comparing potential differences between historical botanical specimen images provided by the Botanical Research Institute of Texas and images collected from iNaturalist.

Method

Participants:

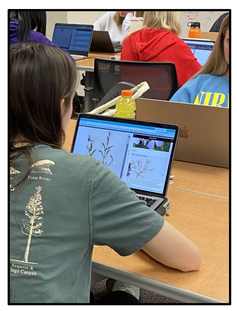
Undergraduate students (n=26) enrolled in a core curriculum course taught by the ranch management department at a private university in the southwest United States.

Data sources:

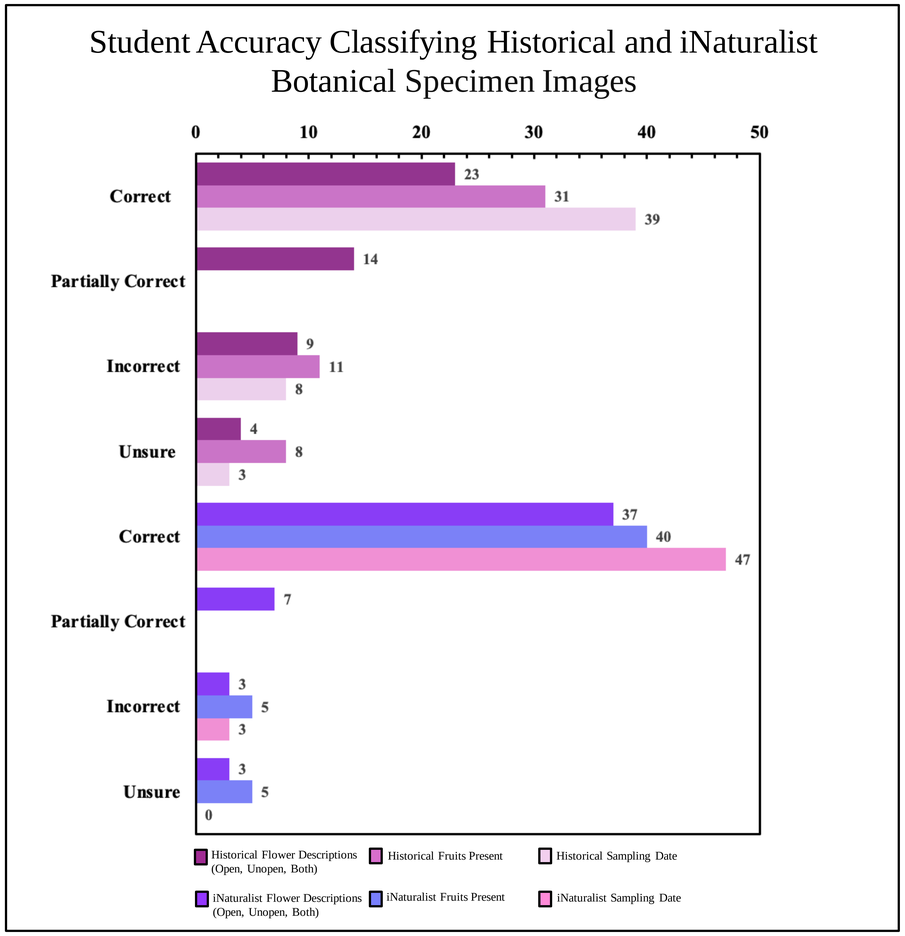
Student classifications (649) of historical botanical specimen images provided by the Botanical Research Institute of Texas and iNaturalist. The data were collected from Zooniverse following classification sessions four (historical images) and five (iNaturalist images).

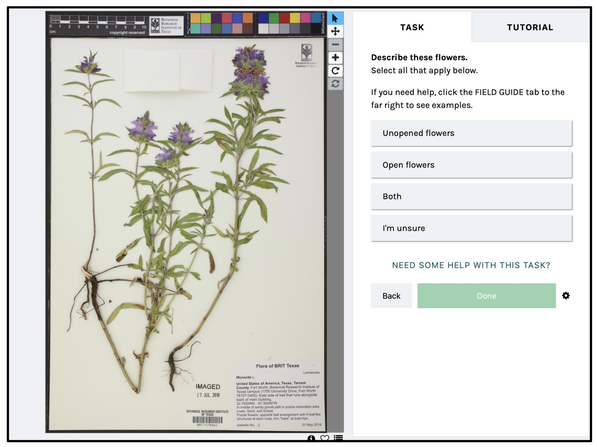
Data analysis:

Classification accuracy was based on three criteria: flowering descriptions (open, unopen, or both), presence of fruits, and recording of the date the sample was collected. A data set of 100 randomly sampled images from student classifications were independently verified by research members to establish a baseline. Student classifications were compared to the baseline and categorized as correct, partially correct, incorrect, or unsure (selected by the student). Descriptive statistics (measures of central tendency and frequency) were utilized to identify patterns and trends.



Results





Discussion

Given the significantly greater proportion of students accurately identifying all three criteria in the iNaturalist photo dataset compared to historical photos, we will leverage these findings to inform our timeline for future groups of students engaging in plant classification. In subsequent studies, it may benefit undergraduate students to classify iNaturalist imagery prior to classifying historical imagery as the latter may present more challenges with ambiguity.

Limitations

A limitation of this study is the small sample size. Additional research is needed in the field of science education to inform the usage of community science platforms in undergraduate education spaces.

References

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Acknowledgments