AN ANALYSIS OF FOSSIL IDENTIFICATION GUIDES TO IMPROVE DATA REPORTING IN CITIZEN SCIENCE PROGRAMS

MONTANA STATE UNIVERSITY
Master of Science in Science Education

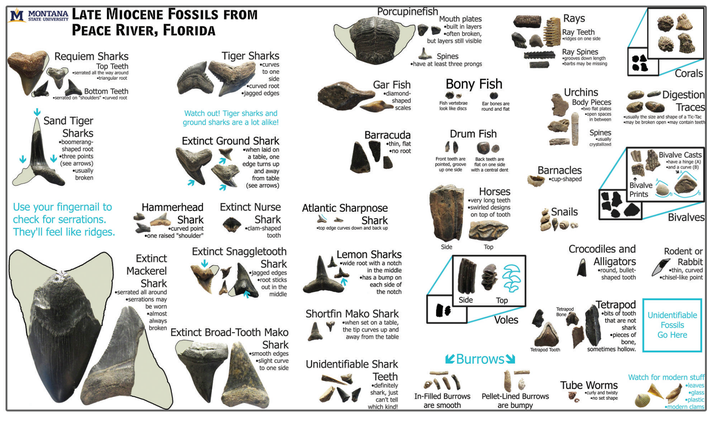
La Vega I.S.D

Girl Scouts
Girl Scouts of Central Texas

BACKGROUND



Science instruction frequently relies on field guides. Students and professionals alike use these visual keys to identify species. Surprisingly little research has investigated field guides under controlled conditions. Testing variables to improve their effectiveness would benefit everyone who uses field guides: professionals, students, and hobbyists.

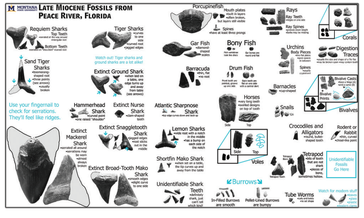


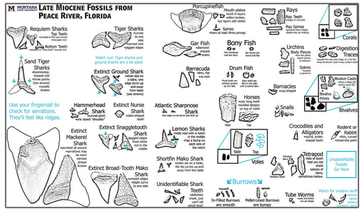
METHODS



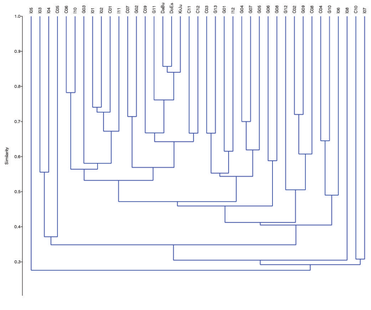
Three nearly identical field guides for identifying the fossils of the Peace River Formation were produced. The only variable on the field guides was the image style: color photograph, grayscale photograph, or illustration.

Subjects sorted fossils out of sediment from a Polk County, Florida, microfossil site. They used one of the field guides to identify fossils. This data was compared with data produced by three graduate students who identified their own finds using published descriptions.





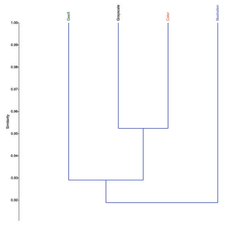
Subjects also answered a survey about their current education, whether they have previously found a fossil, and their interest level in finding fossils.



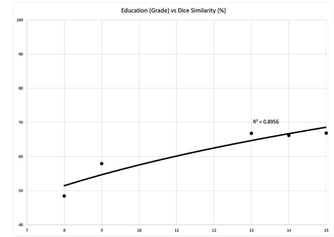
The paleontological statistics package, PAST, was used to analyze data from subjects.

DATA





Note: Cluster analysis of the combined data of all participants. GeeX combines data from the authors, who each have substantial geology experience.



Note: Participants in this study who have advanced degrees produce data matching the authors' data by over 65%, despite having no previous experience in paleontological research.

Effects of experience and interest on identification

Combination of factors	Correlation with DaBu	Correlation with DoEs	Correlation with KrJu	Correlation with GeeX
Some experience, moderate interest	60.481%	62.813%	59.779%	61.024%
Some experience, high interest	51.622%	52.795%	48.098%	50.838%
No experience, moderate interest	52.569%	50.890%	48.427%	50.629%
No experience, high interest	40.972%	42.229%	40.864%	41.355%

Note: Author names are abbreviated "DaBu" for Dava Butler, "DoEs" for Donald Esker, and "KrJu" for Kristopher Juntunen. GeeX combines data from the three authors, who each have substantial geology experience.

QUESTIONS



The primary goal of this study was to analyze field guides for effectiveness in helping citizen scientists correctly identify fossils.

1. Which image style leads to more accurate data?

2. What qualifications does a citizen scientist need?

3. Is data from citizen scientists usable in paleontology?

CONCLUSIONS



Field guides that use photos, whether color or grayscale, are the most helpful to novices. Higher education also improves accuracy, despite none of the subjects having studied related fields. Previous experience finding fossils improves accuracy, but high levels of enthusiasm dramatically decrease accuracy.

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