Enhancing Image Quality for Fossil Identification

Megan Spielberg

Fontys University of Applied Sciences, Eindhoven, Netherlands

1 Introduction

The Problem: Current platforms provide no guidance during photo capture and very limited guidance prior to capturing the photo.

Why It Matters:
- Fossils are identified remotely through photographs
- Poor quality images reduce identification accuracy
- Experts waste time requesting re-submissions
- Low-quality data limits AI training effectiveness

Solution: Real-time and post-capture feedback guides users to improve image quality before submission.

2 Approach

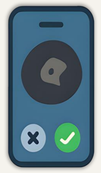
Curiosity

Citizen scientists explore beaches, uncovering Ice Age fossils

Capture

Participants photograph their finds using a smartphone app

Feedback



The app provides instant guidance before submitting

Quality Assessment

Each photo is evaluated using expert ratings and automated metrics

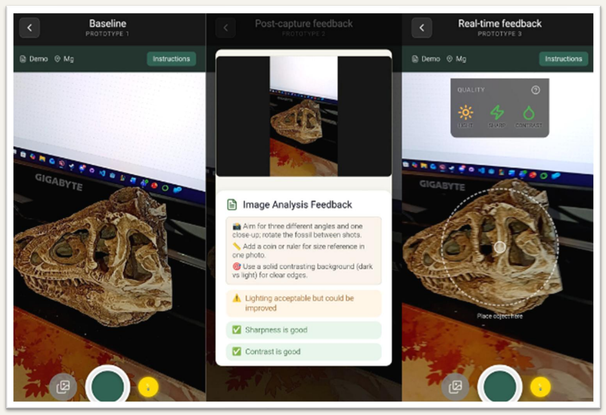
Evaluation

A/B testing compared AI-assisted vs non-assisted photos

3 Methods

Comparative experimental study

- 20 participants tested all 3 prototypes
- 183 fossil images analyzed
- Measured: lighting, sharpness, contrast (automated) + scale presence, viewing angles (manual ratings)
- Usability: System Usability Scale (SUS)

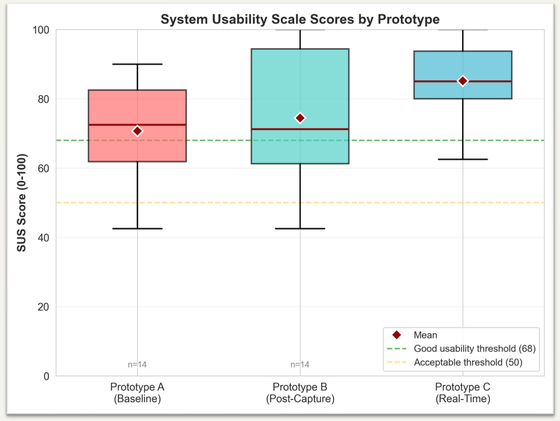


4 Results

Key Finding: Real-time feedback significantly improved contrast ($p = 0.002^{**}$), but not other metrics.

Usability (SUS Scores):
- Baseline: 66.5
- Post-Capture: 70.6 (not significant)
- Real-Time: 80.9 ($p = 0.0006^{**}$, +14.4 points)

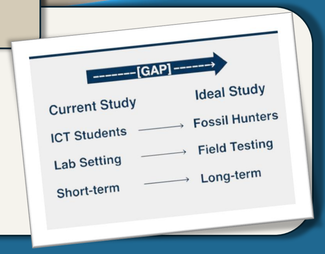
Unexpected Finding: More time spent ≠ better quality (negative correlation with lighting, $p < 0.005$).



5 Future work

Limitations: Non-randomized order, ICT student sample, short-term testing only

Future Work: Field testing with fossil hunters, Improve scale & angle guidance, Study long-term learning effects



GitHub Project Page

References

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