Online Learning with 3D Virtual Rocks? Pedagogy & Technology

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Engagement & Learning

You: "You can't learn exactly the same from a 3D model as from a rock in your hand because you can't pick up a 3D model."

Me: "Correct, but only about 5% right."

You: "How can that be?"

Me: "Pick up that rock on the table. Examine it. Then on your cellphone retrieve the model (instructions on handout on table). Follow activities."
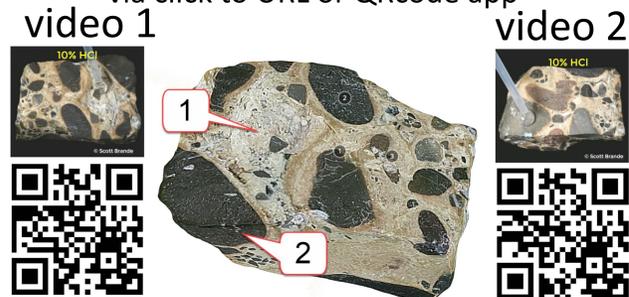

How *Do* Students Learn in Geology Lab?

Work in teams; communicate among members
Make, record, and analyze observations
Test rocks for relevant physical properties
Consult resources, evaluate alternatives, propose ideas
Make conclusions (identification of rock by name)

How to *Adapt* Activities for Online Use

Extend observations and experiments to online by linking to online resources (high-res images, video snips, data, etc.). Accessible by click on hyperlink markers on model that load via click to URL or QRcode app

video 1   video 2

Face-to-Face vs Online Lab Learning

- physical rocks
- limited set
- campus access only

- 3D virtual rocks
- unlimited set
- access anytime, anywhere

"Online Lab" Pedagogy

- *Guided instructions* for observations
- *Make model interactive* (not just for looking)
- *Hotspots* with clickable links to resources
- *Channels* for *interactive communication*
- *Questions* that *require* observations, interpretations, discussion and *responses*

What's my size? (click for ruler) gravel, sand, or mud?

reacts to HCl? (click to test via video)

What am I – A) matrix or B) grain?

A) rounded or B) angular?

sedimentary, igneous, or metamorphic rock?

A) fine- or B) coarse-gained?

What's my name?
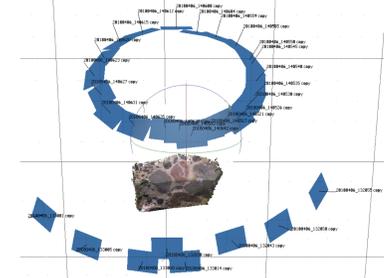
(Answer: https://goo.gl/FjWeG7)
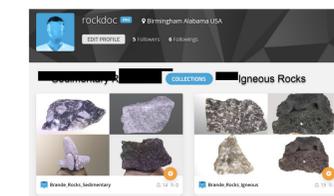
Into The Tech Weeds

1. Photograph w/cellphone

2. Build 3D model w/Photoscan[1]

3. Upload to Sketchfab server[2]

4. Sketchfab server to browser in student devices

Online archive[2]: www.sketchfab/rockdoc

Teaching Innovation Grant Awarded[3]

Create client-server system with

- user interface for interaction with 3D models
- serve diverse devices (laptops, cellphones) & operating systems (Windows, iOS, Android)
- text chat channel connects students in teams
- collect data analytics of student interactions

References
1. http://www.agisoft.com/
2. www.sketchfab.com/rockdoc
3. http://www.uab.edu/reporter/work-resources/learning-development/item/8043-10-grants-to-promote-innovative-teaching

Earth Educators' Rendezvous
Lawrence, KS, July 16-20, 2018

Project 3D Virtual Rocks

UAB