

Increased Student Engagement Through Augmented Reality – A Catalyst for Learning?

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The near constant use of hand held technology has become the norm in modern society and while GPS in every pocket has made navigation easier for many, it has resulted in new challenges for educators in the classroom. Over the past decade, as the impact of augmented reality (AR) on learning has begun to be researched, we should be leveraging the devices we already have in our homes and pockets for improving undergraduate education. Here we present results from two distinct studies in introductory geoscience education that improve student engagement through the use of AR.

Study 1: AR Field Trips

Geoscience educators have long considered field trips to be the best way to attract students into the discipline, however they are often not possible in high-enrollment introductory geoscience courses. Three AR field trip experiences (on geologic time, geologic structures, and hydrologic processes) were developed and tested for their efficacy in student interest and learning. They utilize the GPS capabilities of smartphones and tablets, requiring students to navigate outdoors in the real world while following a map on their smart device. The results of this study, involving 873 students from five institutions, show that students who completed all three virtual field trip modules were significantly more interested in learning the geosciences than control students who did not complete any.

Study 2: AR Sandbox

Research has shown that undergraduate students have significant difficulties interpreting information presented on topographic maps, especially visualizing 3-dimensional landforms. Very recently, and thanks to the freely available instructions and software from UC Davis [1], AR sandboxes have been set up in several museums and universities. This work assesses the impact of the AR sandbox on student engagement and student learning in introductory geology labs using nearly 800 students. We integrated an AR map-replicating challenge activity into the traditional topographic map exercise for the experimental groups, where preliminary results show significantly higher student engagement.

We anticipate interest gains leading to student success.

[1] <http://idav.ucdavis.edu/~okreylos/ResDev/SARndbox/>