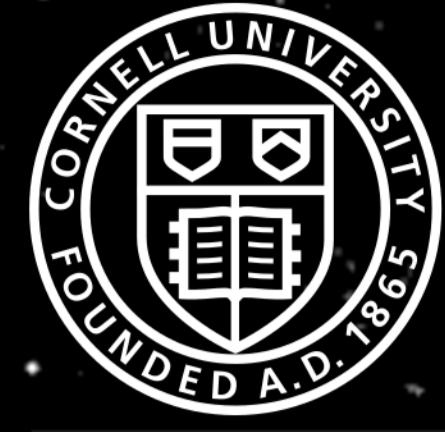


# Virtual Reality as a Teaching Tool for Moon Phases and Beyond

Jack Madden,<sup>1</sup> A. S. Won,<sup>2</sup> J. P. Schuldt,<sup>2</sup> B. Kim,<sup>2</sup> S. Pandita,<sup>2</sup> Y. Sun,<sup>2</sup> T. J. Stone,<sup>2</sup> and N. G. Holmes<sup>3</sup>



<sup>1</sup>Astronomy and Space Science, Cornell University, Ithaca NY 14850

<sup>2</sup>Communication, Cornell University, Ithaca NY 14850

<sup>3</sup>LASSP, Cornell University, Ithaca NY 14850



References

jmadden@astro.cornell.edu

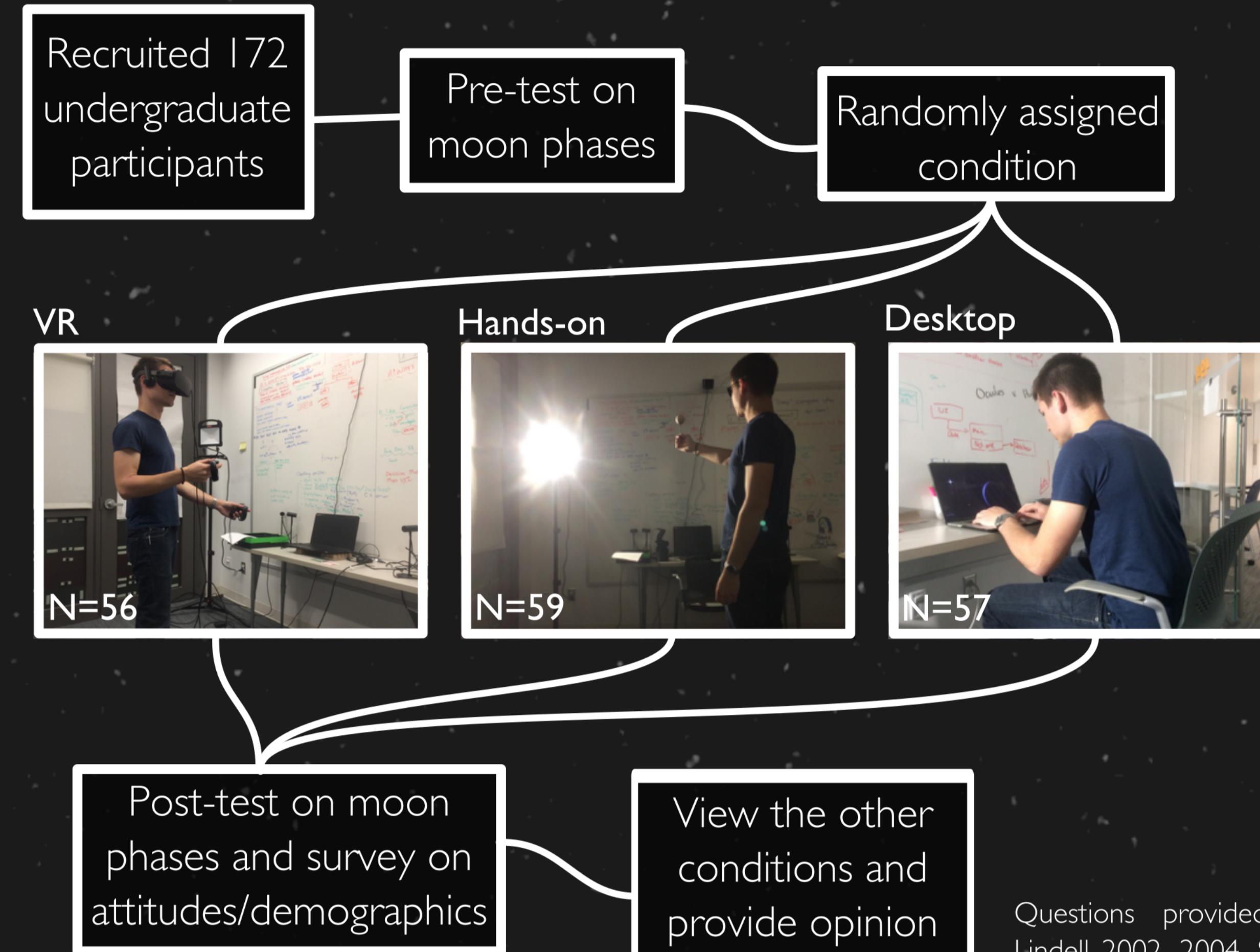
<http://astro.cornell.edu/~jmadden>



## Introduction

In an educational context virtual reality (VR) provides a classroom with the embodied learning of a hands-on activity and the digital versatility and consistency of a computer simulation. This makes immersive VR a potentially effective teaching tool, but not much research has been done to test it. **We used the intro astronomy subject of moon phases as the topic to measure the learning gains between a self-guided lesson in VR and traditional lesson activities.** We found a strong participant preference for VR relative to the traditional methods. However, we observed no difference across conditions in average levels of performance on a pre/post knowledge test.

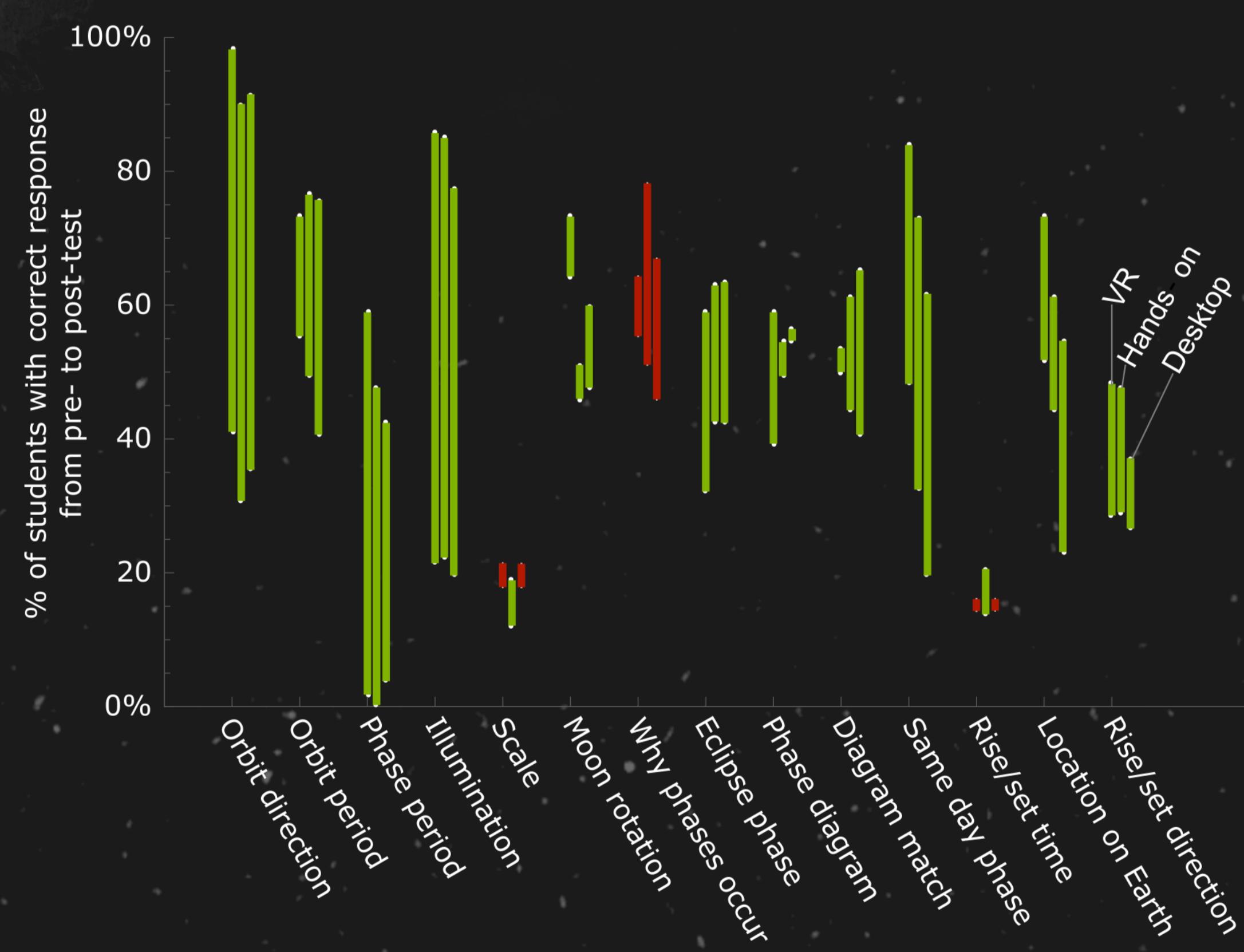
## Method



Questions provided by Lindell 2002, 2004, Slater 2014, and Hufnagel 2002

## Result 2: Pre/post test scores by question

When looking at the performance from pre to post test broken down by topic we see that each condition was similarly capable of conveying the concepts. This chart shows performance gains (green) and losses (red) of the participant pool broken up by condition on each question topic.



## Result 3: Condition Preference

After the post-test, participants saw the other two conditions they hadn't seen and were asked their preference. There is a striking preference for VR.

Which of the three ways to simulate moon phases is your favorite?

78.2%  
VR

10.0%  
Hands-on

11.2%  
Desktop



## Conclusions and Future Work

By examining the learning gains of participants after lessons utilizing virtual reality and traditional methods we find no significant differences except for personal preference, which strongly favored VR. **This work shows that even at VR's early stage of development and adoption it is capable of teaching the content as well as current tried-and-true methods and with higher student interest.** Further analysis needs to be done on any demographic correlations to performance such as video game experience and previous VR use.

This work was supported by Oculus Education.