Center for Teaching Excellence – Reflective Practice

Teaching Circle Mini-Grant Application ~ 2014-2015

Cover Sheet

DUE NO LATER THAN 4:30 pm on October 10, 2014

Contact Person(s): John Chrispell
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Project Title: Immersive Education with the Oculus Rift

Collaborating Faculty Names: Francisco Alarcón, Tim Flowers, Charles Lamb, Dan Radelet, and Ed Donley

Amount Requested: $375.00

Brief Project Abstract (attach longer proposal of 1-2 pages; 500 word maximum):

Our teaching circle is devoted to examining the potential of new and emerging technologies when teaching, sharing, and learning mathematics. The Oculus Rift is a virtual reality headset that allows the wearer to experience a virtual world through the use of head-tracking and stereoscopic 3D. We would like to purchase one of the Rift headsets and explore its potential when teaching, and sharing mathematics.

Immersive Education with the Oculus Rift

Background: Visualization of mathematical concepts and simulations plays an integral role in how information is processed. Finding creative ways to present information, and concepts, allows for new insights to be gained from instructional and research materials. Instruction that stimulates more than just auditory senses is more likely to enhance the learning process. It is the goal of our teaching circle to explore emerging technologies and their use when sharing and learning mathematics. The Oculus Rift shows potential to fully immerse both students and faculty in mathematical visualization, and will allow for mathematical simulations and models to truly be experienced.

Figure 1: Image of the Oculus Rift Headset. Image Source: https://www.oculus.com

Faculty and Student Learning: The Oculus Rift is a virtual reality headset with low latency head tracking and stereoscopic 3D (presenting a unique image for each of the wearer's eyes) that can create a fully immersive virtual experience. The Oculus software development kit is publicly available and supports Windows, Mac OS X, and Linux Operating systems, allowing for flexible cross platform application development. The Rift has potential as a visualization tool for 3D models found in many mathematics courses including: vector calculus, modeling and simulation, operations research, fluid dynamics, and general image processing. The goal using the Oculus rift would be to take 3D data sets, normally explored by rotating a 2D projection, and create a fully immersive experience. Using the Rift would afford both faculty and students the opportunity to learn new programming techniques and the chance to see data sets in a fun new interactive way. In addition to use by our teaching circle and by students on class projects the immersive mathematical experiences created using the Rift may also be used as a recruitment tool for students who are considering IUP or a career in the mathematical sciences.

Budget Rationale: The cost of the Oculus Rift Development kit prohibits a large number of the devices being purchased. A single development kit is requested for examination, and will be shared by members of the teaching circle and interested students.

The development kit includes:

- Oculus Rift Headset with 2 Pairs of vision lenses
- External Camera (for positional tracking) and Camera USB cable
- HDMI-DVI adapter and Sync cable
- Power cord and adapter for USB on Rift Headset

Orders will be placed at: https://www.oculus.com/order/

- Specific Order: One Oculus Rift Development Kit 2 ---------- $350.00
- Shipping Cost (Estimated) ---------- $25.00

Total Budget: **$375.00**