Submit Grant Proposal | VR@Illinois

Submitted by:
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1. Name
Christopher Ball

2. Email
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3. Your Status
Faculty

4. Your Department
Journalism

5. Provide a brief summary of the VR/AR project that would be funded by this grant proposal

The STEM DiVRsity Enhancement project seeks to increase Science, Technology, Engineering, and Math (STEM) career interest in unrepresented minority groups. Research indicates that there is a growing demand for highly skilled STEM workers in these increasingly high-tech fields. Unfortunately, research also indicates that certain key groups such as women and racial minorities have been traditionally underrepresented in STEM careers. Possible reasons for this problem include a lack of STEM role models and STEM-related self-efficacy. The STEM DiVRsity Enhancement project seeks to address both root causes through an innovative research, education, and outreach initiative that leverages the power of VR to both educate and excite. The proposed project will attempt to accomplish its goals via a co-production VR strategy that connects UIUC students (both undergraduate and graduate), faculty, staff, and a local school in order to create, disseminate, and test STEM-related VR content. A working group of UIUC students will be formed, with guidance and input from interested faculty and staff members. This group will create STEM-related VR content with the goal of highlighting diversity in STEM. For instance, VR content could include VR news stories on prominent minority experts at UIUC (i.e., potential role-models). Participating undergraduate and graduate students will gain knowledge of the literature surrounding STEM inequality, an appreciation for STEM diversity, and hands-on VR production techniques. The DiVRsity working group content will then be pilot tested at a local school in order to test if exposure to the VR STEM content and VR technology influences students' STEM self-efficacy and interest in pursuing STEM education/careers. The DiVRsity working group students, faculty, and staff will be encouraged to participate in the outreach and research portions of this project, ultimately culminating in authorship on potential conference papers, journal publications, and future funding opportunities.

6. How much funding are you requesting?
$15,000

7. Provide a brief preliminary budget of how the funds would be used
The proposed budget for this project includes funding for DiVRsity working group student incentives (~$2500), research stipend for DiVRsity working group faculty/staff (~$2500), public school/student incentives (~$1500), programming production costs (~$3000), VR classroom hardware (~$5000), as well as necessary software/licenses/assets (~$500) for the creation and dissemination of the VR content.

8. Describe the anticipated outcomes of your project.
Based on the literature I anticipate that the public-school students will report greater STEM interest and motivation to pursue STEM-related education/careers after the intervention. Another anticipated outcome in that UIUC students will gain VR production experience which could serve as portfolio products and UIUC promotional materials. Furthermore, the DiVRsity project could also serve as a means for UIUC to showcase its faculty and staff diversity while also encouraging further academic diversity in the future. Lastly, I anticipate that this pilot project has the potential to seed a larger NSF grant which could involve a large-scale intervention of this nature in Illinois.

9. What is the proposed timeline for your VR project?
I anticipate a general timeline of 1 to 1.5 years to complete this pilot test.

10. Additional information
Select Relevant Publications: Huang, K., Ball, C., Francis, J., Ratan, R., Boumis, J., Fordham, J. (2019). Augmented versus Virtual Reality in Education: An Exploratory Study Examining Science Knowledge Retention when using AR/VR Mobile Applications. Cyberpsychology, Behavior, and Social Networking. Online First. DOI: 10.1089/cyber.2018.0150. Ball, C., Huang, K., Cotten, S.R., Rikard, R.V. (2018). Gaming the SySTEM: The Relationship between video games and the Digital and STEM Divides. Games and Culture, Online First. DOI: 10.1177/1555412018812513. Ball, C., Huang, K. T., Rikard, R. V., & Cotten, S. R. (2017). The emotional costs of computers: an expectancy-value theory analysis of predominantly low-socioeconomic status minority students' STEM attitudes. Information, Communication & Society, Online First. DOI: 10.1080/1369118X.2017.1355403. Ball, C., Huang, K. T., Cotten, S. R., & Rikard, R. V. (2017). Pressurizing the STEM Pipeline: an Expectancy-Value Theory Analysis of Youths' STEM Attitudes. Journal of Science Education and Technology, 26(4), 372-382. DOI: 10.1007/s10956-017-9685-1 Ball, C., Huang, K. T., Cotten, S. R., Rikard, R. V., & Coleman, L. O. (2016). Invaluable values: an expectancy-value theory analysis of youths' academic motivations and intentions. Information, Communication & Society, 19(5), 618-638. DOI: 10.1080/1369118X.2016.1139616. Huang, K., Cotten, S. R., & Ball, C. (2015). Threatened by

Stereotype: An investigation of the effect of stereotype threat on female and minority students' STEM learning in the context of a computer intervention. Proceedings of the iConference 2015.