

Student Technology Fee Budget Template for 2015-2016 Project Funding Proposal

Project Title:

Stepping into designs: Enhancing immersive project visualization for Interior Architecture & Design students

Organization or College:

College of Fine Arts

Department or Unit:

Interior Architecture and Design

Project Period

2017-2018

Start Date:

Jun-17

End Date:

Apr-18

I. Senior/Key Personnel

List senior and / or key personnel whose compensation will be funded through project non-recurring funds

				Requested		
First Name	Middle Name	Last Name	Project Role	Salary	Fringe Benefits	Funds Requested
A.						
B.						
C.						
D.						
Total Funds Requested for Senior/Key Personnel						\$ -

II. Student & Other Personnel

	Requested			
	Salary	Fringe Benefits	FTE	Funds Requested
Graduate Students				
Undergraduate Students				
Other Personnel				
Total Funds Requested for Students & Other Personnel				\$ -
Total Salaries, Wages & Benefits				<u>\$ -</u>

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III. Equipment

List items and dollar amounts for each item, including software, (or multiple items of the same type with a total cost of) over \$2,000 - add lines as needed

Item Description	Funds Requested
A. HTC Vive	\$799
B. 27" Monitor	\$499
C. Autodesk LIVE (1 year subscription)	\$360
D. HDMI cables	\$ 80.00
Total for items over \$2,000	\$ 1,738.00
Total for Additional items (less that \$2,000 each)	
Total Equipment Costs	\$ 1,738.00

IV. Other Costs

	Funds Requested
Materials & Supplies	
Consultant Services	
Equipment or Facility Rental/Use Fees	
Additional Project Costs (describe in budget justification)	
Total for Others Costs	\$ -
Total Project Cost	\$ 1,738.00

Stepping into designs: Enhancing immersive project visualization for Interior Architecture & Design students

Project Description

A scenario that happens all too often in design: a client walks through a finished space for the first time and is surprised--and dismayed--with the results. Such scenarios often stem from a miscommunication of design intent, often due to the designer's reliance on static drawings and renderings to share ideas. Yet, virtual reality (VR) presents newfound opportunities to immerse project stakeholders into a designed environment during the design process itself, thus potentially helping all parties to realize a more accurate understanding of the design outcome before the project is built (Virtual reality for architecture, 2016). Seeing the opportunities offered by VR, many large design firms have adopted virtual reality as a tool with which to share their design ideas and coordinate activities. Their premise is that these realistic representations reduce the chances of costly changes during construction (Mullins, 2016; Robles, 2015).

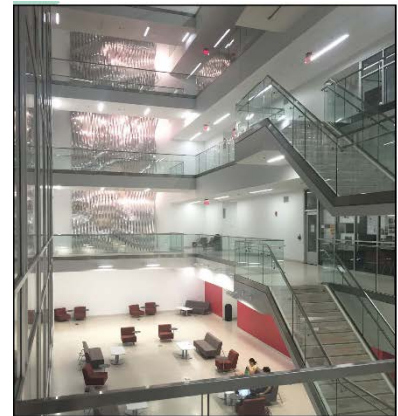
Our Interior Design and Architecture (IA&D) students have been working with virtual reality during the previous two offerings of our Computer Aided Design 2 (IND3469) course--Spring 2016 and 2015. This required course provides students with the skills necessary to produce three dimensional building models and photorealistic representations of their designs. The course also introduces advanced design communication technologies such as animations, and augmented and virtual Reality. As such, the students finish the class with the ability to produce virtual content. Yet, lacking professional quality VR equipment, they have been limited to using the instructor's personal cell phone inserted into a cardboard viewer to view their projects in VR. This solution provides a relatively low fidelity viewing experience with no opportunity to "walk" through hypothetical designs.

Purpose

The purpose of this grant is to obtain:

- 1) a professional quality virtual reality headset, thus eliminating the need for a cellular device and providing wireless controllers that will allow those wearing headsets to move about freely within a defined area,
- 2) a 27" high resolution monitor for parallel viewing, so that others can observe what the person in the headset is seeing, and
- 3) a professional level subscription to Autodesk LIVE, a software that will prepare student generated models for navigable virtual reality, allowing those in headsets to "walk" within a design.

This equipment will be installed on the department's existing high performance computer.



Site Photograph



Figure 1. Image of the existing William Johnston Building atrium (top) and IA&D student generated image of the same space from their CAD 2 project (bottom).

Project Reach

This equipment would be utilized by all students enrolled in IND3469 (a course that is required for all undergraduate students and offered as an elective for graduate students). Additionally, the headset would be available for check out by graduate students for use during project presentations. As such, 220 Interior Architecture and Design students would be positively impacted by having access to these resources. Moreover, students enrolled in the CAD2 class share their work at FSU DIGITECH, and Florida State University's Day at the Capital each year, thus allowing more individuals to experience virtual reality while being *immersed* in the work of FSU students.

Project Goals

There are three primary goals for the requested resources:

1. Cultivate student learning and critical thinking by:
 - Improving the instruction of advanced design communication skills by modeling leading-edge industry practices and allowing students to view their design projects with the same high quality VR equipment that many design professionals currently use.
 - Enhancing the way students examine and review their project outcomes. Being immersed within a design can present students with more potential shortcomings and opportunities which may have went unseen had they produced only a static photorealistic rendering. As such, VR can help prepare students to conceptualize their work in three dimensions and a full 360 degrees.
2. Support the department's goals by:
 - Aiding ongoing efforts to recruit high caliber incoming students. Our department is ranked by design practitioners through the third party organization, Design Intelligence. Many high school students, parents, and guidance counselors view their widely publicized rankings as they determine the quality of design programs. One metric listed on these surveys is the technological proficiency of graduating students. Technology offerings also help attract high quality graduate students who desire programs that are at the forefront of the profession.
 - Aiding ongoing efforts to produce entry-level designers that have a range of communication skills, allowing them to compete for top tier design positions with highly regarded firms. Additionally, firms often look to younger staff to introduce new technology. Having this level of technological experience might help our graduates to be quickly viewed as assets within their future places of employment.
3. Support community outreach by:
 - Providing a means to showcase the work of Interior Architecture and Design students to a broad audience without reliance on paper-based deliverables, thus potentially providing a more sustainable option for design communication in the future.

Project Outcomes

Since VR is already introduced in the course (using lower quality equipment), scheduling impacts would be minimal and with prior testing (conducted in the Fall Semester) the equipment proposed in this class could be seamlessly integrated into the course by providing students with the opportunity to view their two assigned



Figure 2. Image of IA&D student (right) explaining virtual reality technology to FSU 2015 DIGITECH attendee using cardboard viewer.

projects using the new VR equipment, then write assessments of their designs based on this viewing. These models would also be shared by the students at the DIGITECH exhibition and at the FSU's day at the capital. Access to this technology would also have a positive impact on the graduate student experience allowing their capstone and thesis projects to be viewed through VR. This will make them more marketable in the profession.

Project Plan

Two sections of the CAD 2 course are taught each Spring Semester with another section taught in the summer. This would leave ample time for testing equipment and exporting processes prior to the start of class. Graduate students would have the opportunity to check out the equipment throughout the year.

Key milestones include:

2017

June	Purchase equipment
July	Equipment installation on the department's existing high performance computer
August-November	Equipment and workflow testing Begin graduate training and equipment checkout
January	Students begin CAD 2 course and begin project modeling
March	Students finish design and export models using Autodesk LIVE software
Late March	CAD2 students share their work at DIGITECH
April and beyond	Student checkout

2018

January-May	CAD 2 students use the equipment
Ongoing	Student checkout

The submitter of this grant will determine the grant objectives complete after students have shared their designs using the new virtual reality device at the 2018 DIGITECH showcase.

Relationship of the project to our missions

The proposed grant activities are in keeping with both the university's and the Department of Interior Architecture and Design's missions.

At the university level, the grant will **expand** student **knowledge** by providing first-hand, **technology**-driven learning experiences, allowing students to learn about advanced technology processes and view their own work with greater fidelity. The grant will also allow students to **disseminate** their design ideas to each other and to the larger university audience by sharing their work in VR at project reviews and exhibitions. By exploring new ways to communicate design intent, and in turn, help students assess their design outcomes, the grant will support **excellence** in **teaching** and **creative endeavors**. Moreover, the students will gain new **skills** in the advanced technologies being used within the design profession. Finally, the resources could provide tools for data collection in graduate student **research**.

A component of the IA&D mission is to impart values of **human-centered design**, and provide students with the knowledge necessary to produce beautiful, functional and sustainable interiors. Immersive design visualization afforded by VR will allow IA&D students to more holistically visualize their designs. This technology would allow for one to navigate hypothetical environments, viewing student work from a full 360 degrees, at eye level, and as similar as currently possible to how one would actually experience the space after construction, thus giving them deeper insight into the perspective of others.

Justification within the industry

Making changes once a design is under construction is expensive, time-consuming, and even wasteful. VR is thought to reduce these types of changes, saving money, time, and resources (Cronin, 2016; Robles 2015). Moreover, design practitioners who currently use VR say that in addition to enhancing client communications, VR helps them to judge design options, evaluate spatial relationships, and more accurately experience a space's proportion and scale, thus helping them to make important design decisions (Virtual Reality for architecture, 2016).

That said, the use of VR will likely grow with the design industry, and with the purchase of a few relatively low cost items (the estimated cost per student is \$7.90) Interior Architecture and Design students can be better prepared to leverage these tactics in the future.

Estimate of ongoing support

The ongoing support for this project will be relatively minimal.

Ongoing Cost-The only ongoing cost would be the monthly fee of \$30 for the license of Autodesk LIVE (\$360 annually). IA&D will pay the monthly fee after the termination of the grant.

Ongoing Support-College IT staff would maintain the monitor, and the grant submitter would maintain the VR viewer and it's associated equipment.

Description of Project Team

Amy Huber-grant submitter, primary CAD 2 instructor, IA&D faculty technology lead

Huber has 6 years of professional experience as a project designer at a highly regarded architecture and design firm. She leads the Department of Interior Architecture and Design's technology implementation; overseeing approximately \$96,000 in equipment, its annual software deployment, and the department's technology curriculum.

Huber has been working in virtual reality and augmented reality for three years. Recently, she was a speaker at the largest software conference for design industry professionals, and while there enrolled in a course on virtual reality to ensure she was planning for an industry-relevant and student-appropriate virtual reality experience.

While other faculty will not be teaching how to use the VR viewer and create content directly, their students will be able check out the equipment to use in presentations, thus Huber will demonstrate the technology to interested faculty members during 2 training sessions.

Budget and Budget Justification

The total cost of this grant is **\$1738**. The proposal consists of hardware and software purchases only.

Hardware

- Virtual Reality Headset (HTC Vive) **\$799**
The HTC Vive is a well-known (and highly reviewed) virtual reality headset which has been used with the proposed software. What distinguishes it from its counterparts is that in addition to the headset, it includes two wireless controllers, two base stations, and link box. These accessories coupled with its *Breakthrough Stream VR Tracking™* software tracks the headset's position within a space, allowing users to have unobstructed movement within set parameters. It also provides the option for users to provide haptic feedback which allows for a more immersive experience than was previously possible in similarly priced VR headsets.
- Monitor (Dell 27" Ultra HD 4K high definition monitor) **\$499**
The monitor will be used for parallel viewing of the headset's screen. The proposed size is larger than the department's existing monitors and would allow the entire class to view VR environments in greater fidelity than our building's existing ceiling mounted, standard fidelity projectors. The acquisition of this monitor would allow enhanced communication during project reviews and student exhibitions since the audience can see the same image as the individual wearing the headset.

Software

- 1 year subscription to Autodesk Live **\$360 (\$30 per month)**
Autodesk holds the largest market share of architectural software, thus many firms are already using Autodesk products, leading them to adopt LIVE for their VR purposes. Additionally, since the students are modeling their designs in Autodesk's Revit software, LIVE will simplify the file conversion process. Moreover, due to the widespread adoption of Autodesk programs, there are typically more resources and user forums available for Autodesk products than nascent software companies. Additionally, the professional version of LIVE allows for navigation (i.e. walking through a design), an option that IA&D students did not previously have. The grant submitter has recently viewed several LIVE models on the HTC viewer, as well as discussed the software options with its developers. After this exploration, it was determined that this software provides the right balance between high quality visual fidelity, ease of file conversion, and relatively low learning curve.

Accessories

- (2) HDMI 3-in-1 cables \$80
One cable will be used to connect the Link Box to the headset and one to connect the monitor to the department's existing high performance computer.

References

Cronin, M. (2016, November). *Revit to Google Cardboard*. Presentation at Autodesk University, Las Vegas, Nevada.

Motte, J. (2016). 2016 the Year of VR: Stingray and LIVE Design. *CGA Architect*. Retrieved from

Mullins, B. (2016, March 3). BIM at human scale. [Web log post]. Retrieved from

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