UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

Computer Station with VR System for School
of Architecture and Design

Title

BoSheng Liu

Name of Submitter

(Faculty or Staff Only)

College of the Arts, School of
Architecture and Design

Organization

Title: Assistant Professor   Date: 2019/01/15

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Department/College/Org: School of Architecture and Design/College of the Arts

ABSTRACT (250 words or less):

School of Architecture and Design (S.O.A.D) has three design departments, including Architecture, Interior and Industrial Design. Our program teaches the design students to implement critical thinking to undertake a design solution. The program encourages our design students to use a range of practices and design means to creatively resolve a given problem. The general range of means from conventional hand-crafting (i.e., taking time to cut and construct a well-thought-out study model/prototype by hand), and digital 3D modeling to digital fabrication (i.e., utilizing 3D printing or laser cutting to construction a model/prototype). This comprehensive list of competitive qualities allow S.O.A.D program been recognized by many professionals, but it is missing the digital immersive visualization experience (e.g., Virtual Reality (VR) technology) to connect to the future of the design professions. VR technology is a critical piece of technology that bypass digital fabrication straight to digital immersive visualization, which serves as an alternative design means among design disciplines and professionals. The proposed VR system will be an interdisciplinary design resource for S.O.A.D. design students. This equipment is particularly valuable for the architecture and interior design students that allows them to see their designed building or interior spaces at a full-scale presence. It will enrich S.O.A.D students' foundational understanding of design and space. This will considerably support SI 1 – KPI 2, 4, 5 and SI 4 in the UL' Strategic Imperative Related to Students.

Proposal Description
Purpose of grant:
In recent years, design professions have quickly adapted Virtual Reality (VR) technologies to better their design practice as well as utilizing the technology to creatively interact with the clients. The School of Architecture and Design strives to introduce VR technologies into the student learning process. We believe this mainly fulfills SI 1 that " Implement and sustain student support to retain and graduate students and Improve student success through engagement in high impact practices" in the UL' Strategic Imperative Related to Students[1]. The initiative will considerably support SI 3 and SI 4 in the process.

The objective of this grant proposal is to enhance student's learning experience in design by introducing Virtual Reality (VR) technologies; in this case, HTC Vive and other supporting equipment. This will allow students to immersively visualize their design prior to the creation of any physically scaled model fabrications. Students who use the HTC Vive VR equipment can see their design in 1:1 scale within a simulated digital space. This will provide students the opportunity to iterate and perfect their creative content and design.

The virtual reality equipment will pair with a TV station providing the surrounding viewers or instructors the ability to offer comments about the content and the creative works in a class environment. Students can use the HTC Vive VR equipment outside of class time as long as it does not conflict with a class schedule. HTC Vive VR equipment will be used across all major design disciplines including Architecture, Interior Design, and Industrial Design in the School of Architecture and Design.

The impact on the student body as a whole:
The School of Architecture and Design will utilize HTC Vive VR technologies in design studios at the upper curriculum levels. This equipment will start to introduce and integrate with the DSGN 235 Design & the Computer course where students will learn how to load their model file and control the equipment. Each design course will use the equipment throughout the semester as part of design investigation and research. The level of technology engagement will be based on instructors' demand. The estimated immediate impact will be more than 300 students in the program. The first VR implementation will start with DSGN 235. It is believed that student interest in using VR equipment will continue to rise in the coming years.

HTC Vive VR equipment will be utilized or integrated by the following courses:
1. DSGN 235:   Design & the Computer Core Elective
2. ARCH 301:   Third Year Architecture Design I
3. ARCH 302:   Third Year Architecture Design II
4. ARCH 401:   Fourth Year Architecture Design I
5. ARCH 402:   Fourth Year Architecture Design II
6. ARCH 501:   Advanced Architectural Design I
7. ARCH 502:   Advanced Architectural Design II
8. ARCH 509:   Master's Project
9. INDS 301:   Third Year Interior Design I
10. INDS 302:   Third Year Interior Design II

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[1] University of Louisiana at Lafayette, Strategic Imperative Related to Students
https://www.louisiana.edu/about-us/office-president/strategic-plan/strategic-imperative-students

11. INDS 401:   Fourth Year Interior Design I
12. INDS 401:   Fourth Year Interior Design II

Projected lifetime of enhancement
The equipment and software requested in this grant have varying service lives of 3-8+ years.

- IRIS VR for Rhinoceros 3D   3 years
- Dell Precision Workstation 7920   4+ years
- 10 ft Extra Long Extension Cord   8+ years
- 23" Dell Monitor   8+ years
- HTC Vive   8+ years
- HTC Vive Tripod   8+ years
- Virtual Reality Computer Station   8+ years
- Rhinoceros 3D Version 6 for Windows   8+ years
- Samsung 40" LED TV   8+ years
- Mobile TV Cart   8+ years

Person(s) responsible for implementation, installation, maintenance, operation, and training.

    a. **Person(s) responsible for**

        i. **Implementation**
           BoSheng Liu, Assistant Professor will first introduce DSGN 235 students which is across Architecture, Interior and Industrial Design student to use the machine. DSGN 235 host more than 100 students annually.

        ii. **Installation**
           BoSheng Liu, Assistant Professor, Donny Broussard, Director of Visual Resource Center, and Jason B Bienvenu, IT staff will assemble and install all required software and hardware.

        iii. **Maintenance**
           Donny Broussard, Director of Visual Resource Center, and Jason B Bienvenu, IT staff will regularly perform maintenance on the machine. Other maintenance will be supplied by mandatory training and the purchase of the required technical manual.

        iv. **Operation**
           BoSheng Liu, Assistant Professor, and Jason B Bienvenu, IT staff will oversee the machine operation. The machine is available for who has been trained and certified by BoSheng Liu, Assistant Professor, or Jason B Bienvenu, IT staff.

        v. **Training (with qualifications)**
           BoSheng Liu, Assistant Professor will provide a training program for the students who are interested and all the students in DSGN 235 as well as a step-by-step operating manual will be provided to all students. It will be available online for free.

The proposed general training procedure:
1. Introduction to HTC Vive software interface.
2. VR Machine Set-Up.
3. Introduction to IRIS VR interface in the virtual environment.

Budget Proposal

Equipment

QTY	COST	ITEM
3	$19.99	**10 ft Extra Long Extension Cord** (Free Shipping)
1	$ 499.00	**HTC VIVE Virtual Reality System** (Free Shipping)
1	$ 44.99	**Virtual Reality System Tripod Stands** (Free Shipping)
1	$ 159.00	**Virtual Reality System Workstation Cart - 31 x 24 x 39 - 45"** (Free Shipping)
1	$ 5,660.40	**DELL Precision 7920 Tower** (Free Shipping)
1	$ 479.99	**Samsung 40" LED TV** (Free Shipping)
1	$ 199.90	**Mobile TV Cart** (Free Shipping)
1	$ 210.00	**Dell 23 inch Monitor** (Free Shipping)

Software

QTY	COST	ITEM
1	$ 195.00	**Rhinoceros 3D Version 6 for Windows** (Free Shipping)
1	$4,500.00	**IRIS VR for Rhinoceros 3D**

Supplies   **$n/a**
Maintenance   **$n/a**
Personnel   **$n/a**
Other   **$n/a**

Total Budget: $11,912.28

Budget Equipment Budget and Justification (The narrative of the proposal must include the purpose and justification for each of the items listed in the Budget Proposal.)

1. One Virtual Reality (VR), one DELL Precision 7920 Tower, one DELL 23-inch monitor, three 10 ft extra long extension cord, one HTC Vive VR system, one VR system tripod stands, one VR system workstation cart - 31 x 24 x 39 - 45", one VR computer station, one Samsung 40" LED, one mobile tv cart, one IRIS VR for Rhinoceros 3D, and one Rhinoceros 3D Version 6 for Windows.

   The objective of this VR equipment is to allow students to immersively visualize their design prior to physical model fabrication or design drawings. DELL Precision 7920 Tower with a Dell 23-inch monitor is necessary to run HTC Vive VR hardware along with IRIS VR platform and Rhinoceros 3D Version 6 for Windows software. These two softwares are the essential platforms to visualize digital content in the virtual world. The overall VR equipment will be secured on a workstation cart for moving short distances. The HTC Vive VR system comes with two motion sensors which will be mounted twelve feet above the ground onto two VR system tripod stands. In order for surrounding viewers to see what the user is seeing in the virtual world, a TV mounted to a mobile cart will be connected to the VR system.

Discuss all previous funded STEP projects (if any).
There has been no previous grant awarded to the applicant.