What's the reality of virtual reality in modern research library?
Agenda

• Introduction / Context
• Realities (one year in)
• Metrics on usage
• Plans for future
• Wrap-up / Q&A
What is the Innovation Hub?

- Located in the Research Park
- 20K sq ft w/high-end equipment (3D, cutters, wood-working, steel fabrication, etc)
- Separate/same... staffing as Innovation @ the Edge
- Open to all
- Peer innovators on staff/faculty
- Experts available
- Collaborative Learning
- New methods of pedagogy, research and creativity
What is the Innovation @ the Edge?

• Located in Bizzell Memorial Library – center of campus.

• **Combination of** Makerspace/FabLab/Startup Incubator, Classroom, Seminar Room, Laboratory – Applied work space. Knowledge Creation.

• A **culture (or mindset) of creating new knowledge** using the latest hardware and software.

• Constant **training, workshops, clubs, and events** to build a supportive, interdisciplinary culture.
What is available at the Innovation @ the Edge?

- **Microcontrollers**
  - Classes taught in use of microcontrollers
  - Low barrier to entry
  - Supports reproducible research

- **Informatics**

- **3D Printing**
Virtual Reality

Featuring the O.V.A.L.

Oklahoma Virtual Academic Laboratory
What is OVAL?

● Public facing VR workstations (Oculus Rift, Vive and Google Cardboard)

● Shared analysis and manipulation of 3D assets across a network of virtual reality headsets

● 360 degrees of interactive, educational content
Virtual Reality – Benefits

- **Content Manipulation**
  - Perspectival changes
  - Fragile, distant, expensive, microscopic, specimens

- **Embodied Interactions**
  - No VR gatekeeper
  - “natural” interface

- **Networked HMDs**
  - Shared experiences
  - Remote access
Opened Innovation @ the Edge in January 2016 in Bizzell Memorial Library, Main Floor (heart of campus)  
Opened Innovation Hub in September 2016 in Research Park
Geographically Dispersed Locations

- Innovation @ the Edge
- Innovation Hub

2 Miles
Reality #1 - Creating & connecting similar spaces across campus

1. Spaces in colleges tend to be reserved for those communities.
2. Our Innovation spaces serve everyone, all the time, so...
   - Built our VR units to network
   - Have a van & trolley that runs between the two facilities
   - Coordinate on staffing/policies/procedures/hours
Reality #2 - Introducing new technology requires change.

Introduce in this order:

- Library Team
- Provost, Deans, Assoc Deans, Dept Chairs
- Department Research Liaisons
- New faculty – make them successful!
- Faculty that demonstrate leading-edge tech/thinking
- Donors
- Students
- College Department meetings
Reality #3 - These spaces tend to be used primarily by white, males

Creates a need to:

- Post policies
- Reach out to women/minority groups
Reality #4 - VR takes space, hardware and people

- HTC Vive
  - 9-10 sq ft
  - People to watch cabling entanglements
- Oculus Rift workstations
  - 8 sq ft.
  - We did custom fabrication to support
    - Range of motion
    - Cable management
  - Added off-the-shelf peripherals
    - Leapmotion
    - SpaceNavigator
  - Built Custom PCs (9/10 series)
    - Enlisted student help
    - CPU requirements
Reality #4 - VR takes space, hardware and people

- **People**
  - Started with two Emerging Tech Librarians
  - Expanded to three to accommodate scaling
  - Added staffing time from our Collaborative Learning Commons
  - Established a certified volunteer program
Reality #5 - VR needs a mix of componentry

Software
- Unity3D
  - LeapMotion API
  - Oculus API
  - PUN
- Custom code
  - Interface tools
  - Networking
  - Now on Github!
- Dropbox
  - Uploader
  - Syncing models
Reality #5 - VR needs a mix of componentry

Input\Output
● Public file uploader
  ○ Libraries.ou.edu/edge
  ○ Upload remotely + walk-in to access
  ○ .obj files & textures
● Screencapture
  ○ D2L workflows
  ○ Video/voice capture too!
  ○ Annotation coming...
Reality #6 - We need to radically collaborate!

- Medical Imaging
  - DICOM analysis
- Architecture ("Pioneers")
  - Spatial thinking
- SLIS
  - Scanning + Web Deployment
- Chem/Bio-Chem
  - Outputting video
- Gateway (UCOL)
  - Virtual "Field Trips"
- Anthropology
  - Hominid fossil skull comparison
- Public Schools - outreach
  - FJJMA sculpture visualization
- Journalism
  - 360 Storytelling

Reality #6 - We need to radically collaborate!

- Currently testing OVAL software
  - NSCU
  - University of Arizona

- Content Sharing
  - Virtual Harlem
  - Arizona State Museum

- Working towards shared asset repositories
  - Metadata / Access
  - 3D Scanning
Reality #7 - Plan how you’re going to scale from the beginning

- Design scaling in from the beginning
- Staffing
  - Existing staff
  - Volunteers
  - Part time workers
- VR technology advancing rapidly
  - Mobile versions better & better
- Keep advancing your design (See OVAL 2.0)
Reality #8 - In particular, plan to support several types of VR devices, especially Google Cardboard
Reality #9 - Limit use for gaming, focus on pedagogy & research

• We’re not about this:

• We ARE about this:
“Virtual reality systems, like the OVAL platform, can greatly assist designers in explaining their design solutions to others by providing more realistic spatial experiences. Impacts include communication between designers, between students or professionals in the built environment disciplines and also between designers and clients. Use of this technology is also making its way into design firms primarily as an alternative method of communication for clients. Students who are able to utilize and understand the advantages of these virtual reality systems during their academic careers have a competitive advantage for future employment. “ Elizabeth Pober, Professor of Architecture & Matt Cook, Emerging Tech Coordinator
Reality #10 - VR Attains results.

Document/publish/promote.

- “VR has been shown to lead to better discovery in domains whose primary dimensions are spatial” (Donalek et al).
- FOR + Stereo + Parallax = Search, Quantitative estimation, Shape Description, Pattern recognition, Spatial Judgement, etc.
- In Medicine, Engineering, Architecture, Archaeology, Art + Art History, and more.

Plans for Future

- Ability to manipulate/interact w/ objects and API’s
- Weather research
- Distance Learning
  - “Meet me in VR”
  - MOOC applications
- Broad/Deep VR Collections
  - Metadata/Content creation
- Preserving Serendipity
  - Exploratory browsing
  - Interdisciplinary Insight
Reality #11 - Don’t forget preservation/archiving in doing this work!

The storage and management of research data has become an increasingly important consideration across research universities. Data management plans are now a requirement for meeting federal grant funding applications, and more generally, data management is understood to be essential for promoting data sharing and reuse, protecting sensitive data (e.g., health information), and ensuring the preservation of research data. Ensuring the successful management and preservation of research data involves the establishment of data repositories, i.e., the social (policies, personnel, etc.) and technical (data transfer networks, servers, software, etc.) infrastructures necessary to ensure data integrity and documentation during data collection, processing, transmission, archiving and reuse. Data repositories are more than sites of storage for data; but must document their activities and store the records that document the

Can be downloaded here:

Innovation @ the Edge
Metrics (January-November 2016)

• Consultations: 84
  – Unique departments/organizations by semester:
    • Spring: 20
    • Summer: 18
    • Fall: 20 (so far)
  – Outside OU consultations: 26

• 3D print jobs: 407

• Total workshop participants: 286

• Total course touchdowns in I-Edge: 20

• Number of tours given: 51