Learning in Virtual & Augmented Reality:

Introduction to Technology, Design, and Collaboration for High-Impact Educational Experiences

A Workshop for the Association of Southeastern Research Libraries, February 2020
It's Nice to Meet You!
(Share who you are and where you're from in the chat!)

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Quick Reflection

What brings you here today?

What are you hoping to learn?

What is your comfort with virtual reality?

Virtual what?  I use it every day.

What is your comfort with augmented reality?

Augmented what?  I use it every day.
How can we create and facilitate impactful learning experiences in VR/AR?

- Defining Key Terms and Technology
- AR/VR in Campus Libraries
- Digital Scholarship in Museum Partnerships Model [DSMP]
- Frameworks for AR/VR Learning Design
- Implementing AR/VR Learning Experiences
- Resources
PART 1: DEFINING KEY TERMS & TECHNOLOGIES
A bit of vocabulary

**Augmented Reality**

a computer-generated simulation in which digital objects appear to exist in the real-world by a person looking through a device like a smartphone or tablet

**Virtual Reality**

a computer-generated simulation of an environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment
Digital Terminology & Tools

Viewing VR: Headsets
a head-mounted device with an interior display worn by a user to access virtual reality

Viewing Augmented Reality
tools which aid in creating the illusion that digital objects appear to exist in the real-world

Tablets & Smartphones
Digital Terminology & Tools

**Digitization**

photographing, scanning, 3D scanning or otherwise digitally documenting objects in a collection;

**Photogrammetry**

a process by which a computer program uses photographic images to construct a digital model of a 3D object or space.
Virtual Tour

A digital representation of a place utilizing 360 photography to give the user the sense of being in the space; virtual tours may include interactive components such as buttons, voice over narration and other digital content; virtual tours are most effective when they can be viewed across digital devices such as computers, smartphones, tablets and headsets.

360 Photography

A photographic image or video that surrounds the original point from which the shot was taken.

Digital Terminology & Tools
Digital Terminology & Tools

Video Game Design Software

suite of creation tools for game development, architectural and automotive visualization, linear film and television content creation, broadcast and live event production, training and simulation, augmented and virtual reality experiences, and other real-time applications; otherwise known as "game engines"

VR & AR Creation Software for K-12 Students (and, really, anybody!)

CoSpaces is a mixed reality web-based application that allows users to create and engage with interactive media content. CoSpaces affords student the ability to demonstrate their knowledge in new ways by building virtual interactive worlds, simple or complex. The platform has robust resources for educators
PART 2: AR & VR IN CAMPUS LIBRARIES
VARDIS
Virtual/Augmented Reality
Digital Imaging Studio
@Washington College
PART 3: DIGITAL SCHOLARSHIP IN MUSEUM PARTNERSHIPS [DSMP]
The Digital Scholarship in Community Partnerships project seeks to engage Washington College students in authentic learning experiences by embedding technology-enhanced museum partnership projects into instruction. Through this project, students work in partnership with local museums to develop technology-rich outreach resources which help convey the message of the museum to the world. Working with the museum affords students the opportunity to apply concepts and best practices learned in the classroom to a project that makes a real impact for the local community. Resources created by students involved in the project are then leveraged by local school systems to develop instructional sequences that utilize these resources to meet state standards through the teaching of local history.

When students lead through learning, they make a real impact.
African American Schoolhouse Museum
Betterton, MD

Crooked Tree Museum & Cultural Heritage Center
Crooked Tree, Belize

Betterton Heritage Museum
Betterton, MD

African American Schoolhouse Museum
Worton Point, MD

https://tiny.cc/dspartners
The DSMP Model

A timeline of a DSMP collaboration

1. Initiate Museum Collaboration
2. Pre-Orientaion; First Short-Term Collaboration
3. Museum-Studies Course; Second Longer-Term Collaboration
4. Partnership with Public Schools
5. Implement Classroom Activities
6. Museum Hand-off
PART 4: FRAMEWORKS FOR AR/VR LEARNING DESIGN
FRAMEWORKS for Designing Virtual Exhibits

- **SAMR** model of educational technology
- **UDL** - Universal Design for Learning framework for instructional design
FRAMEWORKS for Designing Virtual Exhibits

SAMR Model

DR. RUBEN PUENTEDURA

SUBSTITUTION
Technology acts as a direct substitute, with no functional change

AUGMENTATION
Technology acts as a direct substitute, with functional improvement

MODIFICATION
Technology allows for significant task redesign

REDEFINITION
Technology allows for the creation of new tasks, previously inconceivable

Creative Commons

Image by DR. RUBEN PUENTEDURA, PH.D. HTTP://WWW.HIPPAUS.COM/RRPWEBLOG/
Augmentation

A VR tour makes the schoolhouse accessible.

Redefinition

A VR reconstruction can transport visitors back in time.

Modification

Augmented Reality brings digital facsimiles into the classroom.
FRAMEWORKS for Designing Virtual Exhibits

Universal Design for Learning

- A framework for designing learning experiences that give all students equal opportunity to succeed.

- Design learning with flexibility and access in mind.

- Designing for inclusivity across difference helps all people.

Provide multiple means of Engagement
Affective Networks
The "WHY" of learning

Provide multiple means of Representation
Recognition Networks
The "WHAT" of learning

Provide multiple means of Action & Expression
Strategic Networks
The "HOW" of learning
In Practice: UDL

When environments are intentionally designed to reduce barriers, all learners can engage in rigorous, meaningful learning.

**Engagement**
- Optimize individual choice and autonomy.
- Minimize distractions.
- Heighten salience of goals and objectives.
- Develop self-assessment and reflection.

**Representation**
- Offer alternatives for auditory/visual information.
- Clarify vocabulary and symbols.
- Illustrate through multiple media.
- Highlight patterns, critical features, big ideas, and relationships.

**Action & Expression**
- Vary the methods for response and navigation.
- Use multiple media for communication.
- Build fluencies with graduated levels of support for practice and performance.
- Guide appropriate goal-setting
Guiding Questions

• Who is able to access this learning experience with the most ease?

• Who is most likely to be left out of this experience?

• How can we add a dimension of engagement, representation, and/or action & expression to our digital asset or accompanying curriculum?
PART 5: IMPLEMENTING AR & VR LEARNING EXPERIENCES
Implementing Learning with AR&VR

Pre- | During- | Post-

**Preparation:**
Check what is available. Set some priorities. Make a plan for how to meet your goals.

**Exploration:**
Follow your path, but don’t get stuck! Keep an open mind. Use all of your senses (and others’, too).

**Reflection:**
Discuss your experience with loved ones. Write in a journal. Do additional research. Connect, question, reflect.
In Practice: Learning Experiences in VR

Preparation

- Do not assume "digital native" - provide direct instruction in tech skills.
- Encourage individual goal-setting.
- Explain how to explore.

Exploration

- Encourage interaction/check-ins.
- Think about ways to engage multiple senses.
- Practice physical safety and consent/orientation processes in VR.

Reflection

- Reflect on the content and the process.
- Revisit individual and task-specific goals.
- Go back! This is one of the most amazing things about digital visits!
Guiding Questions

- What instruction do we need to provide users to ensure they make the most of the experience?
- Are there curriculum or other supplementary materials we need to support engagement?
- How will we know when we're successful, or when we need to revise?
- How much guidance is too much guidance?
Best Practices

Start Small
Small, low-stakes, high-impact projects are the best place to start out

Consider starting with just one collection / room / exhibit

Collaborate
Find partners who will experience a mutual benefit

Make useful things.

Consider alignment between state/national curriculum and institutional mission.

Use the models we suggested as frameworks for decision making.

Design, Test, Revise
Consider iterative design.

Test with real audiences.

Get feedback (and be prepared to respond).

Evaluate.

Use tools that make it easy to revise.

Pivot
Emerging technologies come and go...think of these projects as exhibits, not recreations of your museum.
AUGMENTED HUMAN [BOOK] BY DR. HELEN PAPAGIANNIS
https://www.augmentedhuman.co/

DSMP PROJECT
https://tiny.cc/dspartners

AUGMENTED ARCHIVES PROJECT
https://tiny.cc/ARChives

EDUCATORS IN VR [ORGANIZATION]
https://educatorsinvr.com/

VR/AR PROJECTS, BOOKS & ORGANIZATIONS

VR/AR ASSOCIATION [ORGANIZATION]
https://www.thevrara.com/
GOOGLE CARDBOARD
https://arvr.google.com/cardboard/

MERGE HEADSET
https://mergeedu.com/headset

OCULUS HEADSETS
https://www.oculus.com/

VIVE HEADSETS
https://www.vive.com/us/

MERGE CUBE
https://mergeedu.com/cube

POP-UP PHOTO STUDIO
Click here for link

TABLETOP PHOTO STUDIO
Click here for link

THETA 360 CAMERA

GOPRO 360 MAX

VR/AR & DIGITIZATION TECH TOOLS
THINGLINK
[360 TOUR BUILDER]
https://thinglink.com/

AGISOFT METASHAPE
[PHOTOGRAMMETRY]
https://www.agisoft.com/

ALICEVISION MESHROOM
[PHOTOGRAMMETRY]
https://alicevision.org/

QLONE
[3D SCANNING APP]
https://www.qlone.pro/

UNREAL ENGINE
[GAME ENGINE]

CO-SPACES
[ALL AGES MIXED REALITY]
https://cospaces.io/edu/
UNIVERSAL DESIGN FOR LEARNING: FRAMEWORKS
https://udlguidelines.cast.org/

PLA- INTRODUCTING VIRTUAL REALITY TO YOUR COMMUNITY

ALA-CENTER FOR THE FUTURE OF LIBRARIES: VIRTUAL REALITY
http://www.ala.org/tools/future/trends/virtualreality

LITA- VR, AR, MR AND THE ACADEMIC LIBRARY

KATHY SHROCK: SAMR RESOURCES
https://www.schrockguide.net/samr.html

VR/AR & EDUCATION RESOURCES