Lessons Learned from the Design & Development of VR Applications for Workforce Development

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Two decades of VR development

1999
- Virtual Reality Technology for Aircraft Visual Inspection

2003
- Automated System of Self-Instruction for Specialized Training (ASSIST)

2004
- Actual Cargo Bay Virtual Cargo Bay
  - Virtual Environment for Visual Search Training

Sponsors:
- NASA
- Federal Aviation Administration
- NSF
- Lockheed Martin
- Greenville Technical College
Two decades of VR development

Virtual Reality for NDT Training

Technician performing engine inspection with VR borescope using haptic device

Regional Center for Automotive and Aviation Training

2007

2009

2011 -2015

Actual Turbine Blades

Virtual Turbine Blades

Trade Adjustment Assistance Community College Career Training
Two decades of VR development

COORDINATION NETWORK
Create a collective, end-to-end innovation ecosystem to lower barriers for two-year colleges to embrace VR/AR based technology innovations to enhance personalized learning.

MANUFACTURING ENGINEERING EDUCATION PROGRAM
Establish VR/AR-based programs to better position the next-generation manufacturing workforce to produce military systems and components that assure technological superiority for the DoD.

2017
NSF

2018
Department of Defense

2006 - 2019
VR DEVELOPMENT FOR INDUSTRY

BOEING
LOCKHEED MARTIN
BMW
AIG
A subset of simulations created

~120 SIMULATIONS
Lessons Learned: Immersive experience

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VR/AR environments offer a unique ability to immerse learners in environments they are studying.
Lessons Learned: Enhanced learning outcomes

Exciting and efficient tools which can provide positive learning outcomes, increase learner motivation, teach 21st century job skills, and improve the learning.
Lessons Learned: Systematic development process

A systematic content development process integrating user-centered design process, system analysis techniques, UDL principles and relevant frameworks from educational literature.
Lessons Learned: Integration with other training material

- **Virtual Reality**: Simulations serve as online labs to engage with material.
- **Video Lecture**: Engaging for visual and auditory learners.
- **Open Text**: Robust textbooks for all courses, ebooks available on request.
- **Assessments**: Reinforcement of learning materials through immediate feedback.
Challenges: Device agnosticism

Compatibility with operating systems, browsers and different types of devices, including notebooks, tablet PCs and smartphones.
Challenges: Effective system-level integration

- Effective integration capabilities with other systems (talent management, training, compliance...)
- Support for blended learning approaches
Challenges: Collaborative VR for training

Need for methods to provide training when trainers and trainees are geographically separated
Challenges: Assessments, reporting and tracking

- Ability to create and modify assessments with ease
- Validated methods to assess a trainee’s performance
Challenges: ADA compatibility, Usability, Security

- Need to make VR/AR accessible to everyone
- Create/Borrow/Update the guidelines from HCI literature
Questions?

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