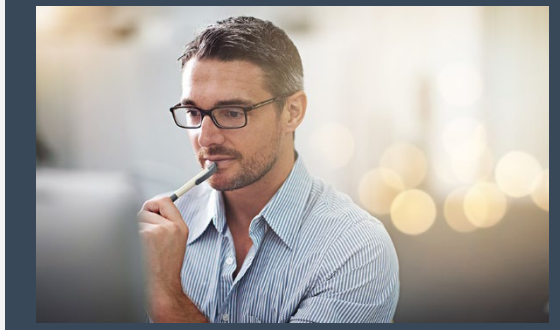
CA²VES

The Center for Aviation and
Automotive Technological Education
Using Virtual E-Schools

Case Study in VR Content Generation for Clemson University Center for Workforce Development

Anand K. Gramopadhye, Ph.D., PI for CA²VES/ CUCWD, Clemson University
Jeff Bertrand, Ph.D., Director of Visualization

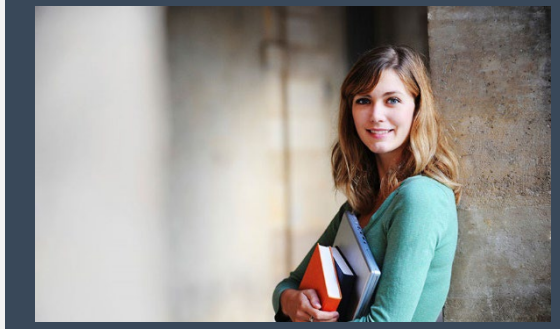
4 Pillars of Workforce Development



1. Digital Learning

Digital tools to increase access to information using virtual reality and e-learning

Visit EducateWorkforce.com



2. Career Pathways, College Affordability & Graduation Improvement

Scholarship opportunities, articulation programs, and stackable certificate options for postsecondary education

3. K-12 STEM Education Initiatives

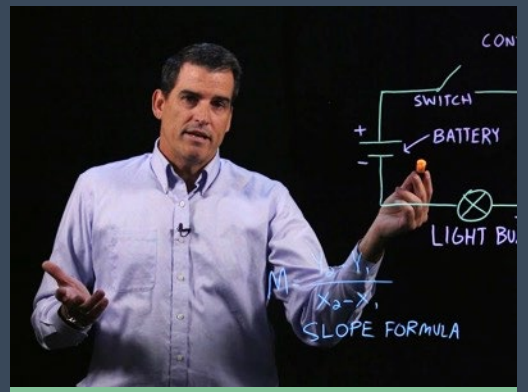
Recruitment, professional development, student engagement, and outreach and support

4. Research, Advocacy & Networking

Education, industry research, organizations and the public to create awareness of workforce development challenges and resources

Innovative **Curriculum Development**

Types of content:

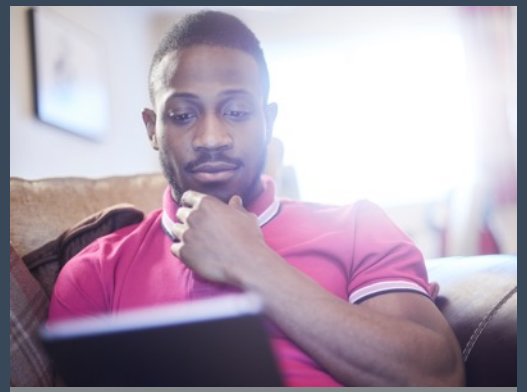


Video Lecture

Engaging for visual and auditory learners

Virtual Reality

Simulations serve as online labs to engage with material



Open Text

Robust textbooks for all courses, ebooks available on request.

Assessments

Reinforcement of learning materials through immediate feedback

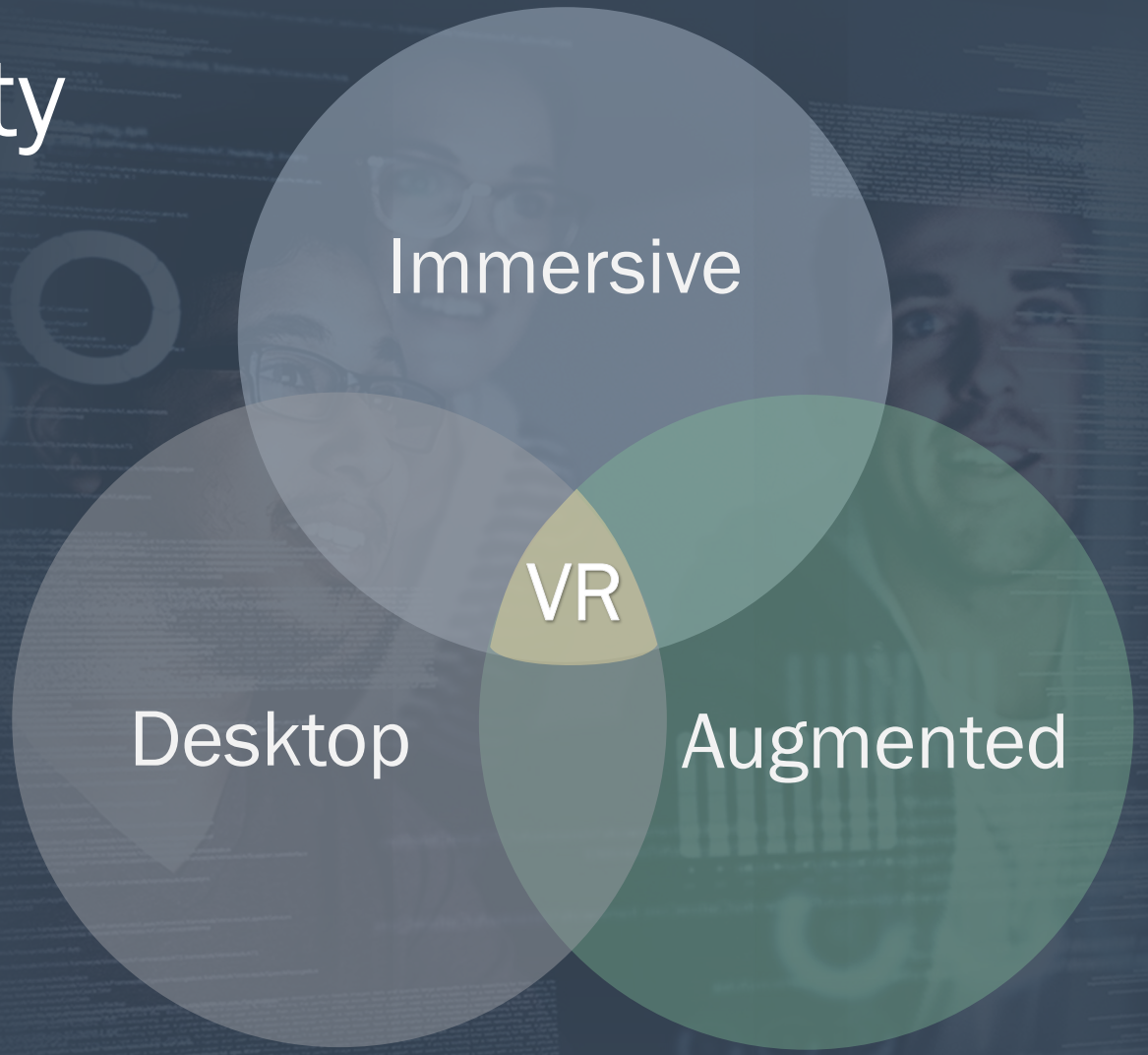
Defining Virtual Reality

Virtual Reality

- Uses interactive 3D graphics
- Simulates scenarios
- Used in a variety of domains

Classifications

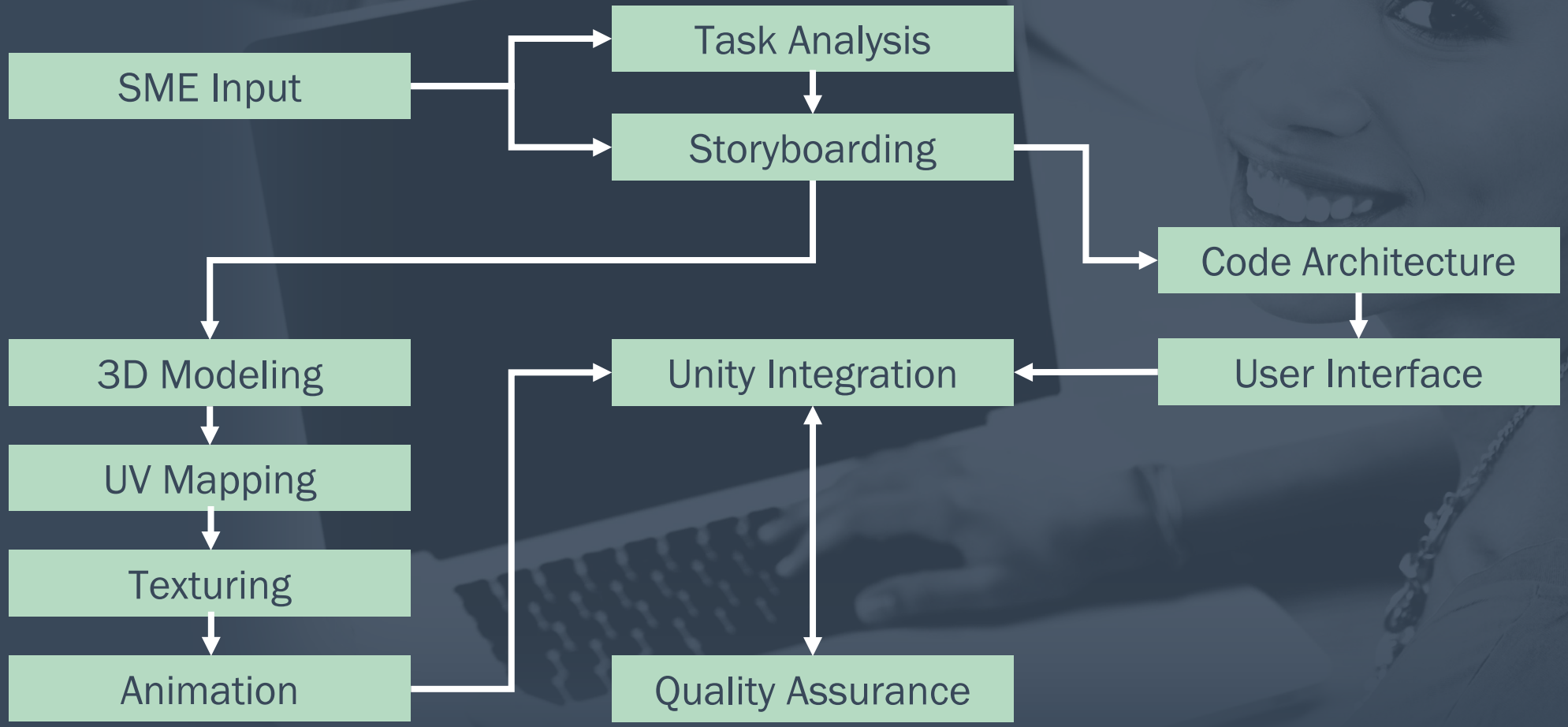
- Desktop
- Immersive
- Augmented



Utilizing **WebGL**

- Browsers no longer support plugins
  - Improved security, speed, and stability
- WebGL runs 3D content directly in the browser without using plugins
- Features not fully supported yet

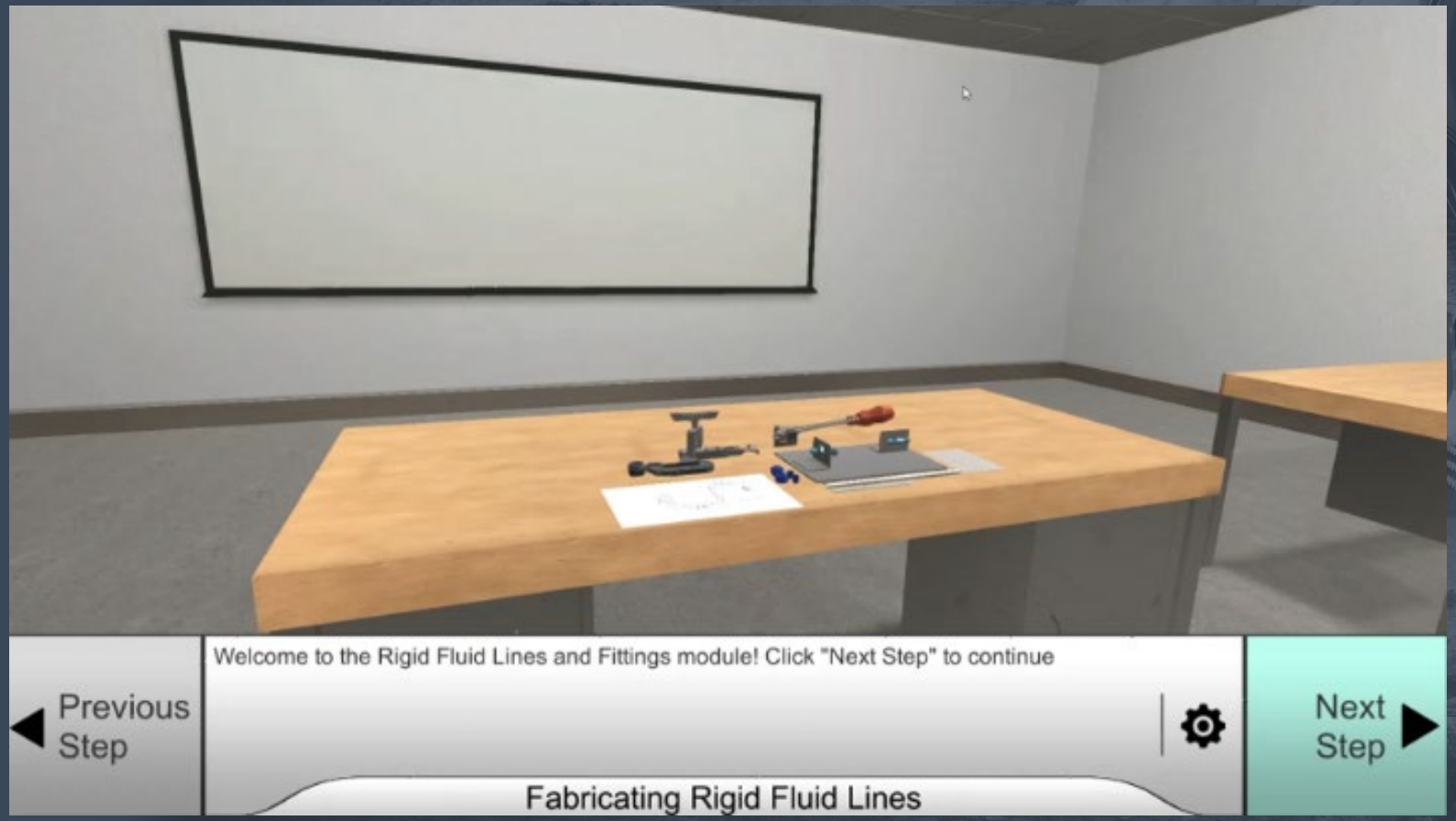
VR Workflow


SME Input
Task Analysis
Storyboarding
Code Architecture
3D Modeling
UV Mapping
Texturing
Animation
Unity Integration
User Interface
Quality Assurance

Safety Hazard Identification

Wind Survey

Fluid Lines & Fittings



CA²VES
2019 CCC Workshop

Aircraft Electrical Troubleshooting

Bimanual Metrology Simulation

EducateWorkforce

Next Steps and Challenges:

- Analytics of student performance inside of virtual reality
- AI: Context based real-time simulations
- Unity 3D simulations: are they future proof and platform agnostic?

CA²VES

The Center for Aviation and
Automotive Technological Education
Using Virtual E-Schools

Questions?

Anand K. Gramopadhye, Ph.D., PI for CA²VES
Jeff Bertrand, Ph.D., Director of Visualization

clemson.edu/cucwd
clemson.edu/ca2ves
educateworkforce.com