THE FUTURE OF WORKFORCE DEVELOPMENT AND PRACTICAL ASSESSMENTS USING VR AND SIMULATION

DISCLAIMER

This session is only for awareness and discussion purposes only.

This session does not qualify you to operate mobile equipment.

Participants are encouraged to take a mobile equipment operator course(s) and/or training that meets the Occupational Health and Safety Regulation requirements and other legal requirements.

About ITI

- Crane, Rigging, Lift Planning Training since 1986
- Instructor-led
- Open Enrollment at 6 Training Centers
- Client Site
- Online Learning
- VR Simulations
- Consulting (Field Services)
- ASME Committee Participation
- LEEA Accredited Provider

Presenter

Andrew Kauser

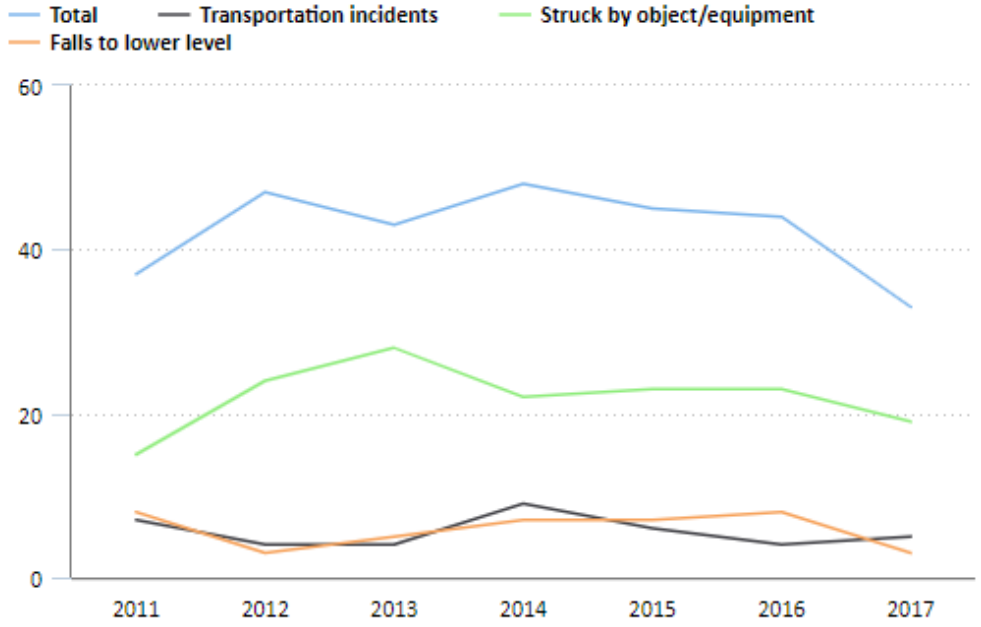
- Chief Product Officer, SVP - Online Learning & Simulation
  - Past Chair of the International Accreditors for Continuing Education and Training
  - Previously President & CEO of TPC Training Systems
  - 30+ Years in Education, Training, and Professional Development


Life Critical
Challenges

Life Critical Challenges – Crane Operations, Rigging/Material Handling

- 90% of crane accidents happen because of human error
- Just over half of all fatal crane injuries involved the worker being struck by an object or equipment.
- About three-fifths of these cases (91 of 154) involved the worker being struck by a falling object or equipment; in 79 of these cases, the worker was struck by an object falling from or put in motion by a crane.
- Transportation incidents and falls to a lower level each made up about 13 and 14 percent of the remaining fatal injuries involving cranes, respectively.

Fatal occupational injuries involving cranes by type of event, 2011-17



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics.

Life Critical Challenges – Crane Operations, Rigging/Material Handling

- High-risk (probability x severity) of Damage to People, Property, Reputation
- Complex Discipline: Heterogeneous Locations, Roles, Equipment, and Activities
- OSHA 29 CFR 1926.1401, 1926.1404, and 1926.1425 require qualified rigger and crane operators

Existing training and assessment programs

- Instructor-led training with hands-on activities
  - NCCCO Rigger Level 1 Certification Test Prep.
  - NCCCO Mobile Crane Operator Test Prep.

Life Critical Challenges – Crane Operations, Rigging/Material Handling

Rigger Level 1 Certification

- Inspecting rigging before use
- Identifying and attaching rigging with basic knowledge of hitch configurations, capacities, and basic knots
- Recognizing associated hazards
- Signaling operations
- Using various types of rigging equipment and basic hitches and their applications

Life Critical Challenges – Crane Operations, Rigging/Material Handling

Mobile Crane Operator Prep

- General Crane Knowledge Training
- Technical Information
- Load Chart Components
- Crane Site and Setup
- Operations
- Practice Exams

CERTIFICATION

Mobile Crane Operator
Overhead Crane Operator
Rigger (Level I, II)
Signalperson

Limitations of in-person training and practical exams

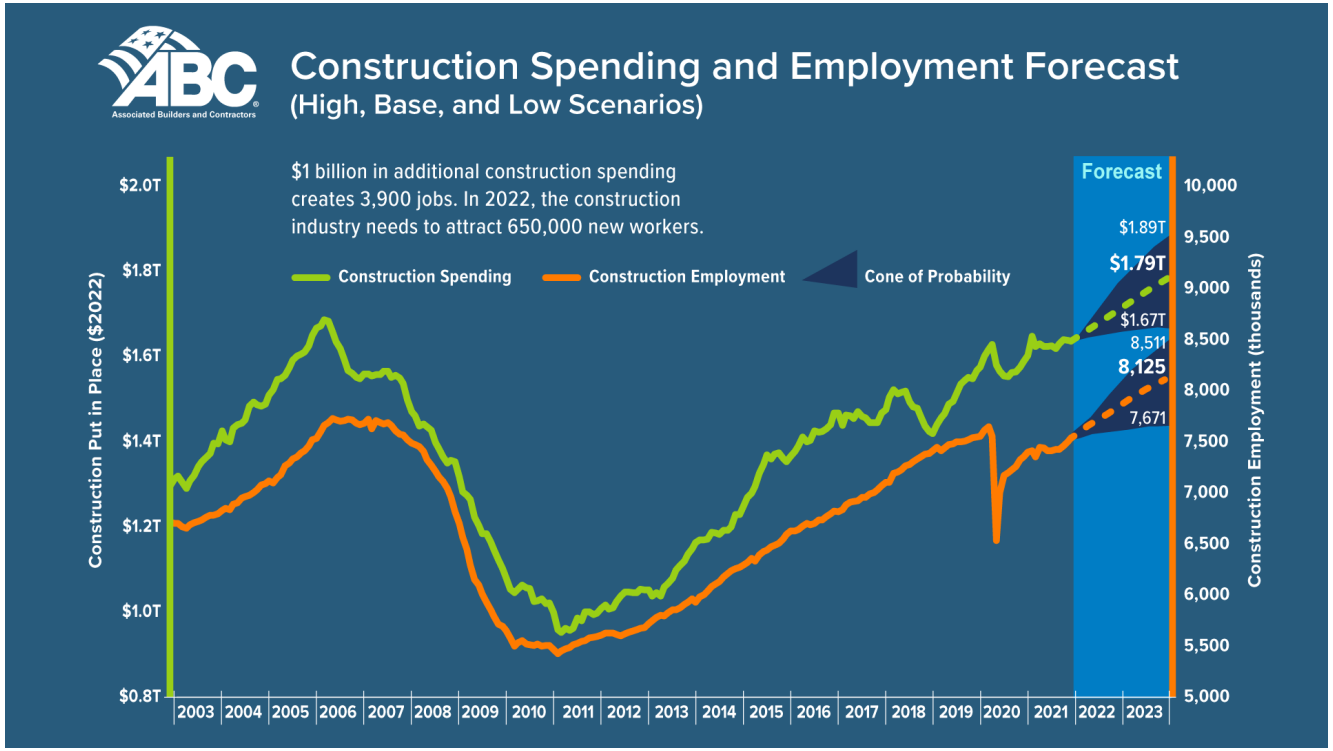
- Difficult to scale
- Expensive to deliver
- Constrained due to personnel and equipment availability
- Limited availability and location constrained
- Must maintain quality standards from one location, instructor, and evaluator, to the next

Macro Trends

Macro Trends – skilled labor shortage

Construction

- The Infrastructure Investment and Jobs Act passed in November and stimulus from COVID-19 relief will pump billions in new spending into our nation's most critical infrastructure.
- $1 billion in additional construction spending creates 3,900 jobs
- 2022 workforce shortage of 650,000 new workers on top of normal hiring to meet industry demand
- 2023 projected to need 590,000 new workers assuming that construction spending slows



Source: Associated Builders and Contractors

Macro Trends – accelerated technology change

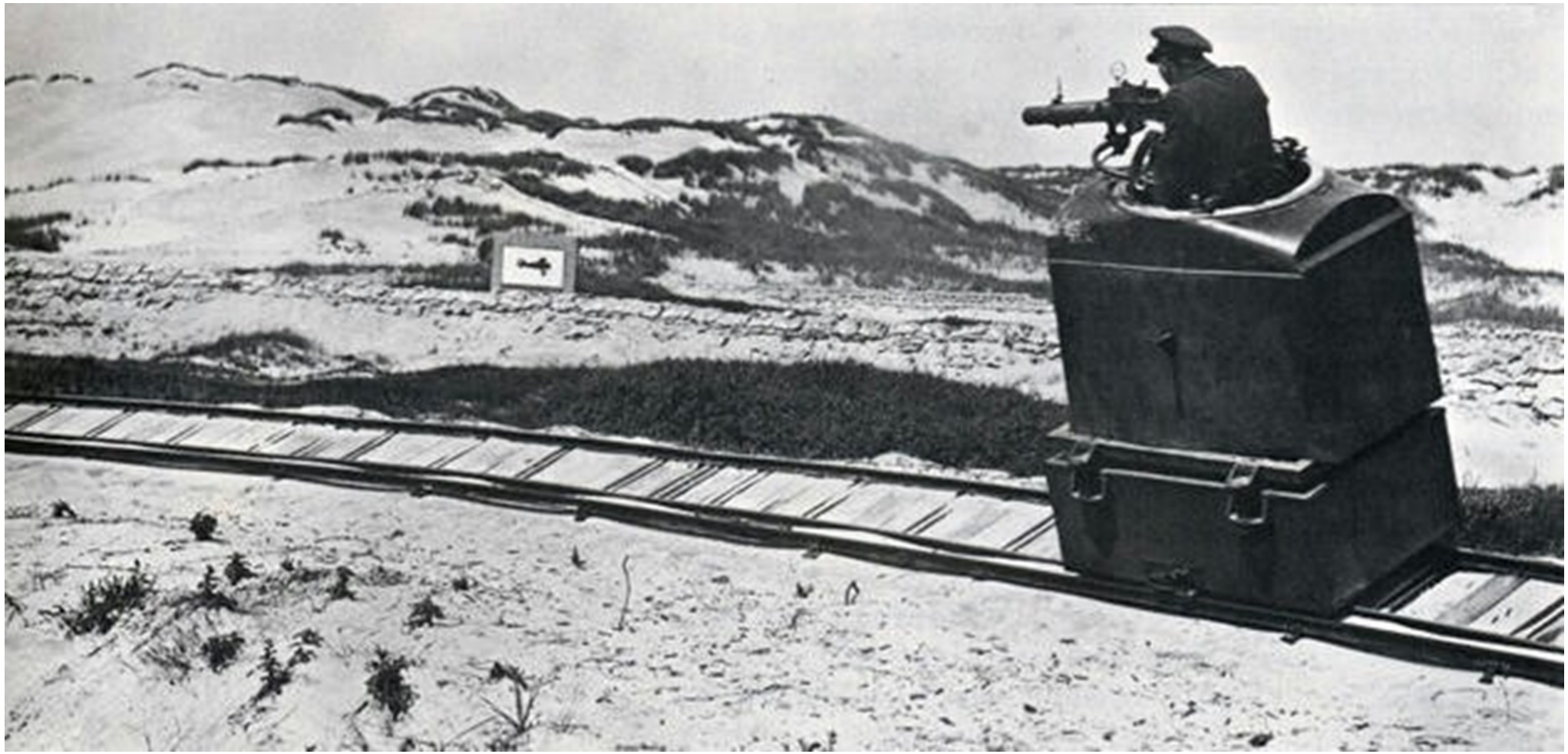
Technology adoption increased rapidly due to the pandemic and its influence is here to stay.

- 64% of respondents learned to do something with technology for the first time.
- 57% used video conferencing to socialize, work or communicate with family
- 23% used a telehealth service
- 21% attended a work conference or training online
- 19% ordered groceries online
- 16% read a menu with a QR code

Simulation & Assessment History

Simulation & Assessment History –

How it started…



Simulation & Assessment History –

How it's going…

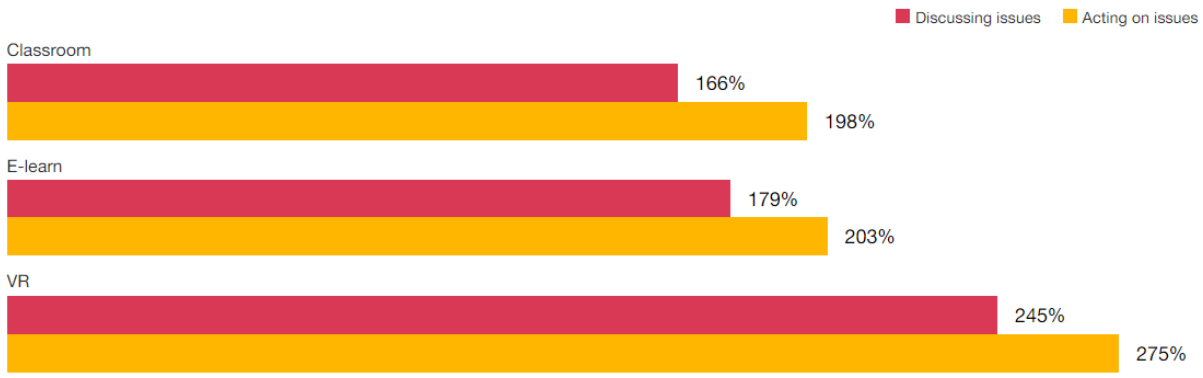
- Commercial Aviation Training
- Motion Platform
- Accurate force feedback
- Fully immersive experience

Why Simulation

Immersive Simulation is proving more effective

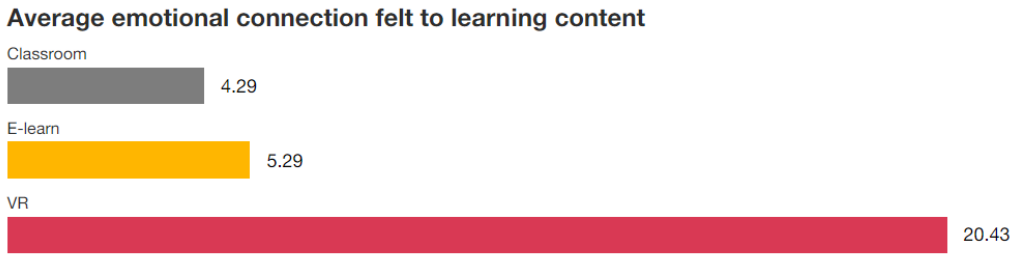
Immersive Extended Reality experiences build stronger mental and emotional connections between users and subject matter.

Learning done in VR works across the four major learning styles**: visual, auditory, reading/writing, and kinesthetic**, resulting in substantial improvements in job performance and information retention.



Source: PwC VR Soft Skills training Efficacy Study, 2020

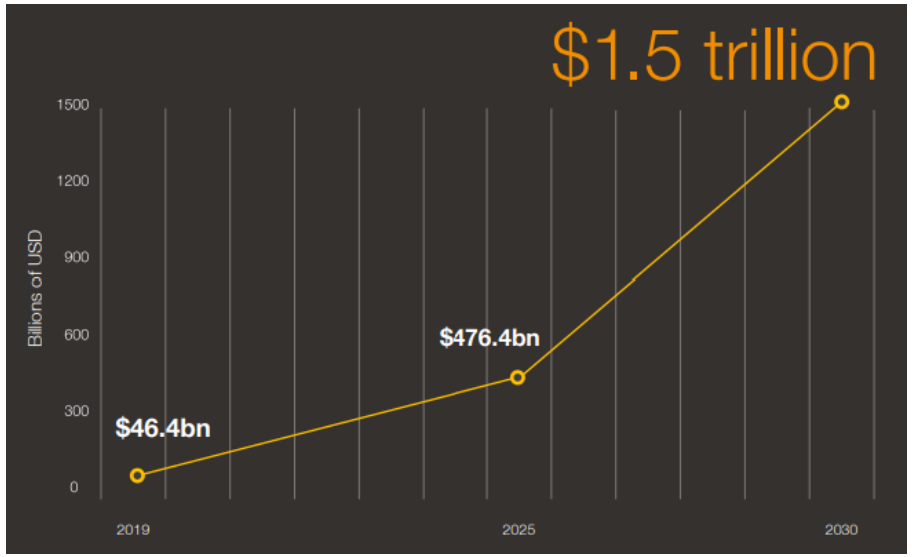
- 70% Greater efficiency in movement and measurements
- 80% Improvement in learning retention
- 83% Documented user improvement in time-on-task
- 2.75x More confidence in taking action
- 4x Greater engagement in training vs. eLearning
- 4X Faster training vs. traditional classroom training



Source: PwC VR Soft Skills training Efficacy Study, 2020

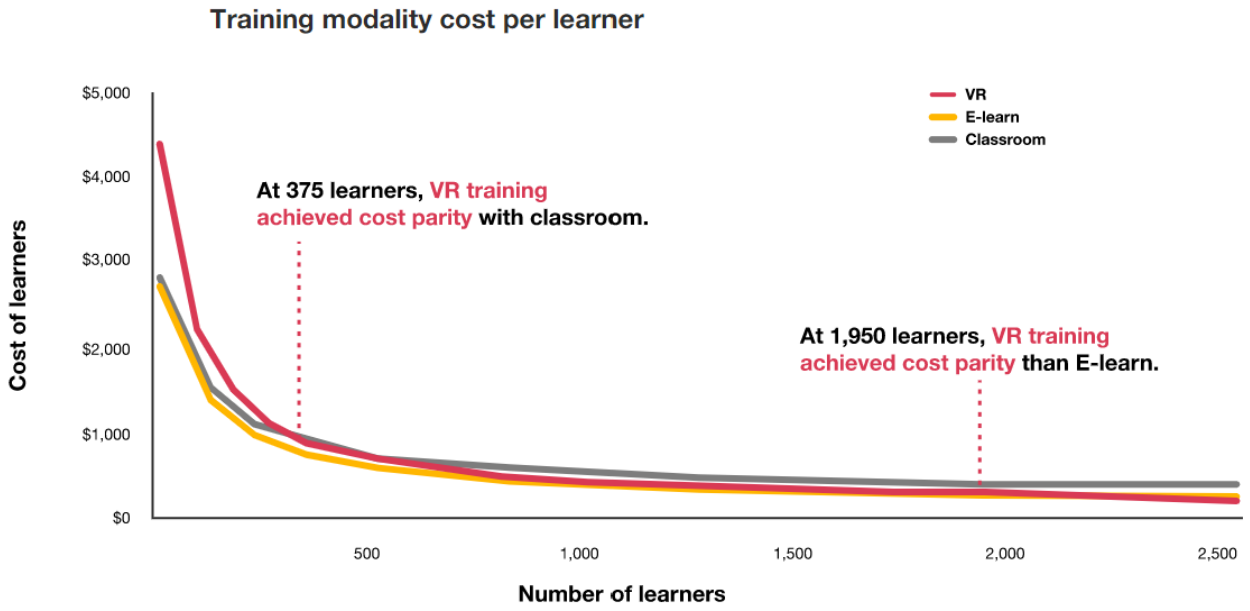
Immersive Simulation is proving more effective

VR and AR have the potential to deliver a $1.5 trillion boost to the global economy by 2030



From creating new customer experiences to speeding up product development and **improving workplace safety**, there are many compelling uses for these technologies that promise to drive growth from the current GDP contribution of $46.4 billion

At 375 learners, VR training achieved cost parity with classroom learning. At 3,000 learners, VR training became 52% more cost-effective than classroom. At 1,950 learners, VR training achieved cost parity with e-learn.



Source: PwC VR Soft Skills Training Efficacy Study, 2020


VR Simulation
for Training

VR Simulation for Training

VR Simulation for Training

SIGMADESIGN

* This slide contains a video. See session recording.

VR Simulation for Assessments

ITI SIMULATION REPORT

Simulation Date: Wednesday, August 10, 2022

Simulation Training Report: USER2 PROGRESS	Company: Industrial Training International, LLC
Crane: Liebherr LR1300SX Fixed Jib	**Configuration:**
Course: Full	**Administrator:**

Scenario Summary

Scenario Name:	Total Time:	Target Time:	Points:	Overall Score:	Result:
Line Up	00:22	01:00	24/25	96%	PASS
Line Left	00:24	02:00	22/25	88%	PASS
Line Down	00:17	01:00	22/25	88%	PASS
L Right	00:51	02:00	7/25	28%	FAIL
Simple Arc	01:20	02:00	17/25	68%	FAIL
Lounger	00:43	02:00	24/25	96%	PASS
L Left	01:20	02:00	0/25	0%	FAIL
Line [Hill]	00:48	03:00	1/25	4%	FAIL
Arc Inverse	00:42	02:00	13/25	52%	FAIL
L Left [Poles]	00:39	02:00	0/25	0%	FAIL
L Left [Poles]	00:49	02:00	22/25	88%	PASS
11 Scenarios	08:19				

Minimum Passing Score: 70%

Scenario Details

Line Up	Attempt 1/1: 00:22/01:00
PASSED: 96%	

Penalty / Bonus:	Occurences:	Deductions / Additions:
Load Ground Collision: Slightly Too Hard	1	-1

Net Deductions: -1 | **Total Score: 24/25**

Line Left	Attempt 1/1: 00:24/02:00
PASSED: 88%	

Penalty / Bonus:	Occurences:	Deductions / Additions:
Load Ground Collision: Too Hard	1	-3

Net Deductions: -3 | **Total Score: 22/25**

Line Down	Attempt 1/1: 00:17/01:00
PASSED: 88%	

Penalty / Bonus:	Occurences:	Deductions / Additions:
Times Chain Left Ground	1	-2
Out Of Bounds	1	-1

Net Deductions: -3 | **Total Score: 22/25**

L Right	Attempt 1/1: 00:51/02:00
FAILED: 28% --- Scenario Failed Minimum Score Not Achieved	

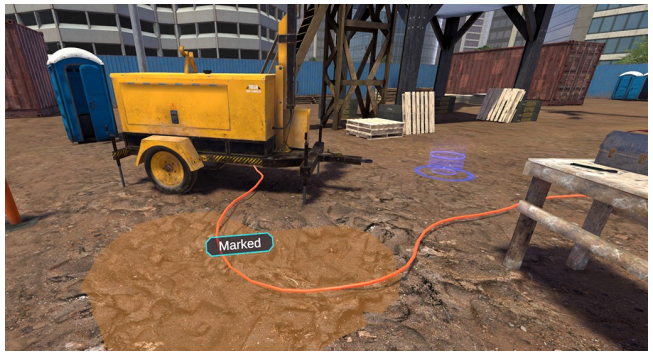
Penalty / Bonus:	Occurences:	Deductions / Additions:
Load Hit Ground	1	-5
Out Of Bounds	11	-11
Unexpected Ground Collision	1	-1

ITI Industrial Training International

Simulation Reports

VR Simulation Training to Improve Safety

1. Identify hazards on a worksite
2. Practice safety techniques
3. Learn the consequences of improper procedures



Construction
- Fall Protection
- Trenching Safety
- Scaffolding Safety
- Electrical Hazards
- Ladder Safety

General Industry
- Warehouse Hazards
- Fire Safety
- Bloodborne Pathogens
- Working at Heights

* This slide contains a video. See session recording.

VR Simulation Training to Improve Safety

Parking at various locations
- Curbside (Curb)
- Back in/up (loading dock)

Avoid fixed/stationary objects
- Cornering
- Backing up
- Park truck/trailer safely into loading/unloading docks

Driving Scenario

Vehicle Control Scenario
- Braking distance/Emergency lane change/Vehicle stability
- Rural Highway solo free drive
  - Lane and speed control
- Rural Highway with AI traffic
  - Merging/Following distance/Passing
- City intersections with stop signs and stop lights
- Constrained Parking/Backing up scenario
- Day/Night/Overcast variations
- Dry/Wet variations
- Distracted driving exercise

PARKING AT VARIOUS LOCATIONS

* This slide contains a video. See session recording.

VR Motion – Teen Driver Study

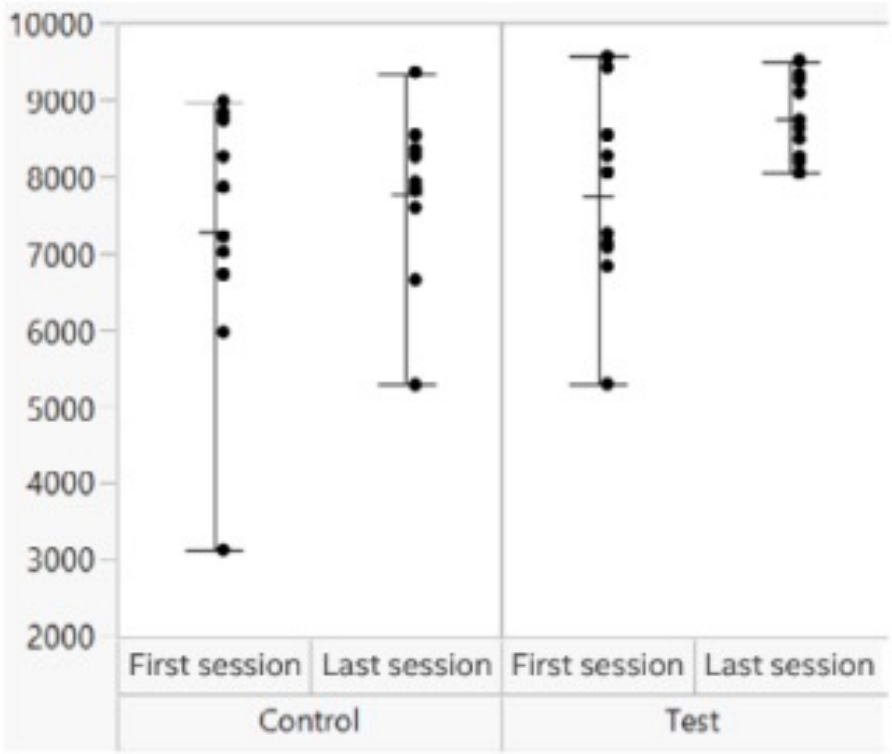


Figure 6. Test group participants showed strong improvement from the first session to the last

Driving tasks

- Each driving session included a brief. introduction followed by three driving challenges:
  - Braking: Come to a fast and complete stop in the braking zone without losing control of the vehicle.
  - Lane change: While driving 40 to 60 miles per hour, change lanes, either to the right or left, when instructed to do so.
  - Slalom: Weave between cones as fast as possible without hitting them.

Scoring

- In each session, participants started with 10,000 points, with deductions for each minor error made during the three challenges (braking, lane change, slalom).

WHY DOES SIMULATION WORK?

1. EXPLORE

The user explores techniques in the safety of the virtual environment.

2. PRACTICE

The user practices as many times as needed.

3. MASTER

Practice leads to mastering the techniques.

4. APPLY

The user applies the techniques learned in the virtual environments to a real-world worksite scenario.

5. SUCCESS

Training on simulators gets the operator to proficiency on controls and applications sooner than just training on machines alone. The virtual environment works equally well for testing as training because you can accomplish a repeatable outcome while testing in a virtual environment.

Contact an Account Manager at 1.309.266.2640 or e-mail sales@catsimulators.com
vwww.catsimulators.com

CAT®

CAT® SIMULATORS

* This slide contains a video. See session recording.

CORRECTION EDUCATION REDUCES RECIDIVISM

60%

People released from prison are within the prime working-age population of 18 to 39 but are unemployed.

43%

Inmates who participate in correctional education programs had a 43% lower chance of recidivating than those who did not.

43%

"Increase possibilities of getting a job upon release" was the primary reason incarcerated adults participated in job training programs in prison.

28%

By participating in specifically vocational/job training programs while incarcerated, individuals increased their odds of post-release employment by 28%.

https://catsimulators.com/about-us/

Interplay Learning

A global platform for the skilled trades

- Serving the HVAC, Electrical, Plumbing, Solar, & Facility Maintenance Industries
- Can deliver to all parts of the marketing including workforce development
- Partnering directly with cert. orgs. To ease career on-ramp
- And what's on the horizon: *teleport training*

Goodwill Industries of the Southern Piedmont

Clayton County Georgia Library System
Cc: Clayton connected

HBI Building Careers. Changing Lives.

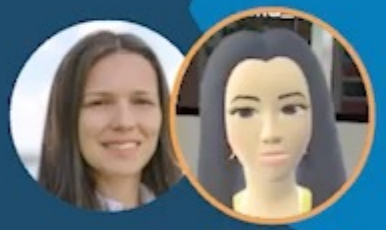
NATE Training Academy

Interplay Learning

Multi-user Instruction

Demonstrated in rooftop unit troubleshooting

Rogan, in UT
Model Instructor



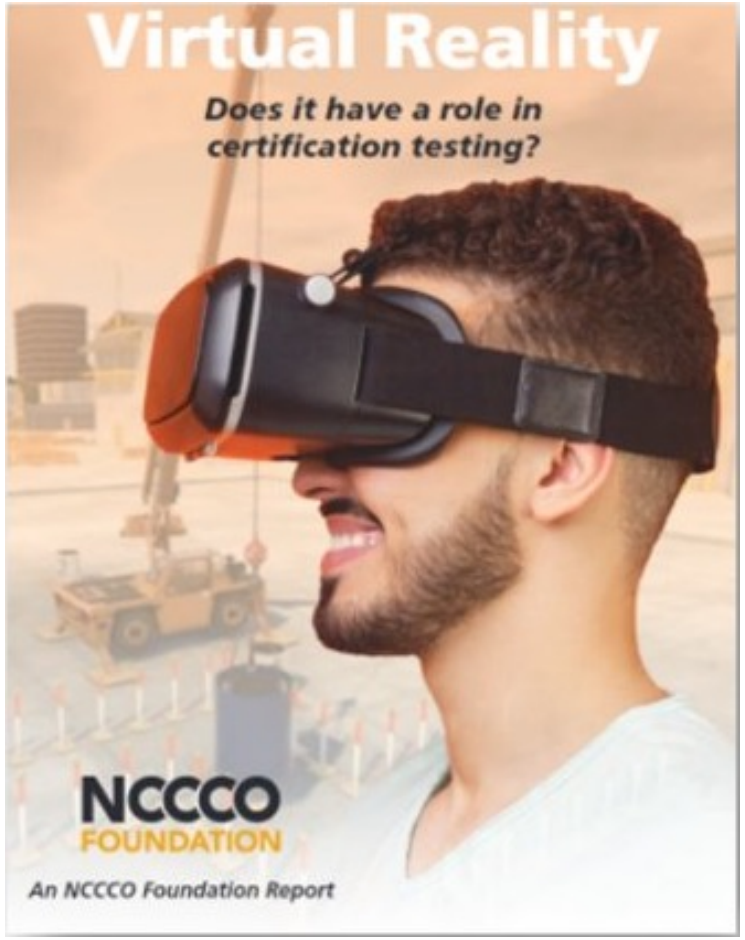
Camila, in NV
Model Technician

Christian, in IL
Model Technician

Jordan, in TX
Model Technician


VR Simulation
for Practical
Assessment


NCCCO
FOUNDATION
NCCCO FOUNDATION REPORT
What is virtual reality's role in the certification of crane operators?
GROVE



"This study has significant implications for the way virtual reality is viewed in the professional assessment community," Wallace Judd, PhD.

ITI Construction Hazard Identification

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17024
PERSONNEL CERTIFICATION BODY

The ITI Construction Hazard Identification certification is the first program accredited by the ANSI National Accreditation Board (ANAB) under ISO/IEC 17024:2012 that uses Virtual Reality examination.

VIRTUAL REALITY PRACTICAL ASSESSMENT FOR CONFIRMING COMPETENCY OF JOB SITE HAZARD AWARENESS

5 Year – National Certification

CHID Assessment Version 1.0

- Display hazards
- Move via teleportation
- Identify hazards using a pointer
- “Progressive only” scoring system
- Unlimited time allotted

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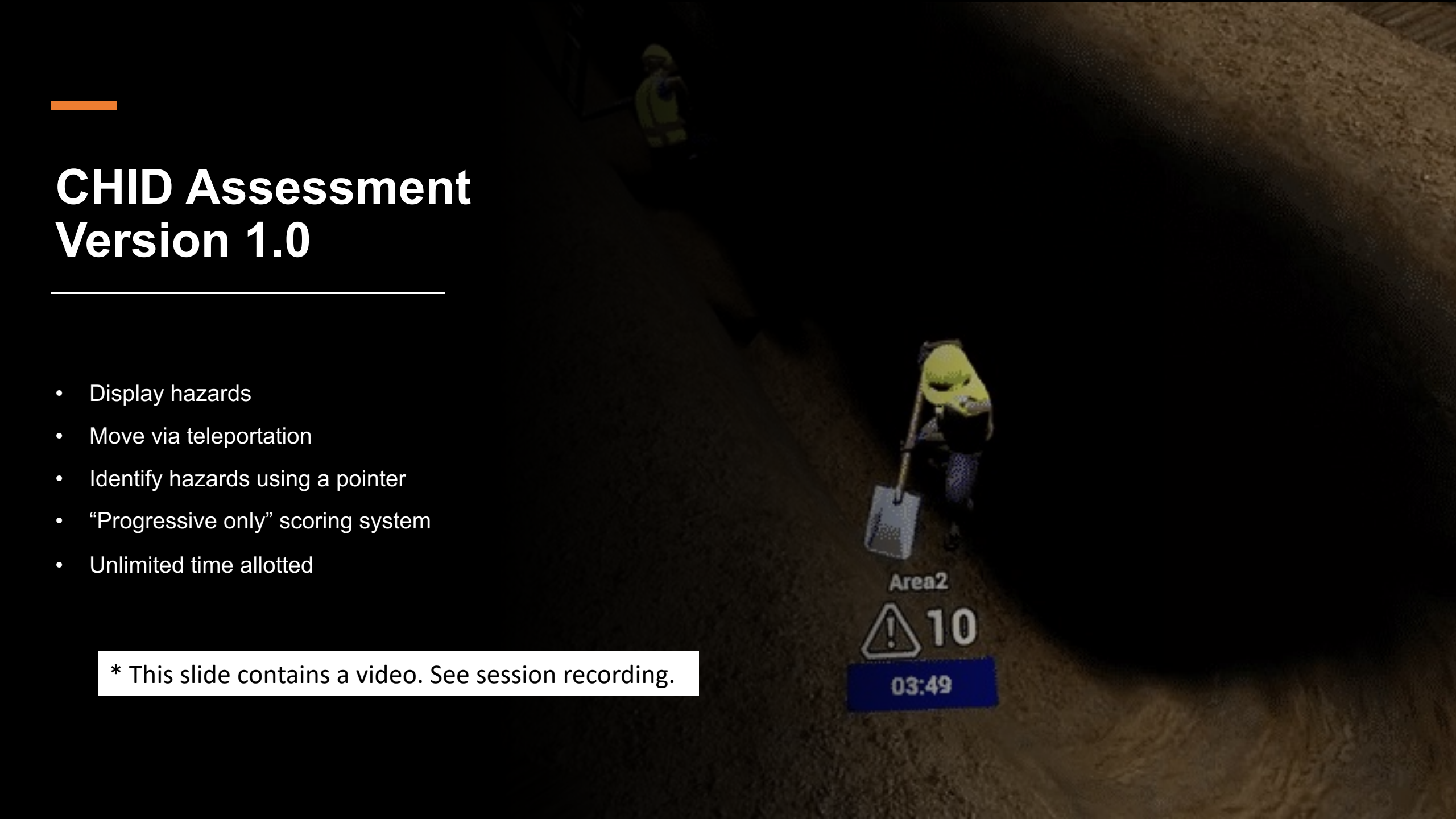

ITI Construction Hazard Identification

- Score candidates as they operate
- Terminate at time limit or when they exit
- Total Points = Sum points of Hazards identified, subtract penalties
- Score = Total points / Sum of available points in playlist
- If score >= 70% Pass; If Score < 70% Fail

* This slide contains a video. See session recording.


Q&A

MIS
MAKE IT SAFE

THANK YOU

For more information, please contact:

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