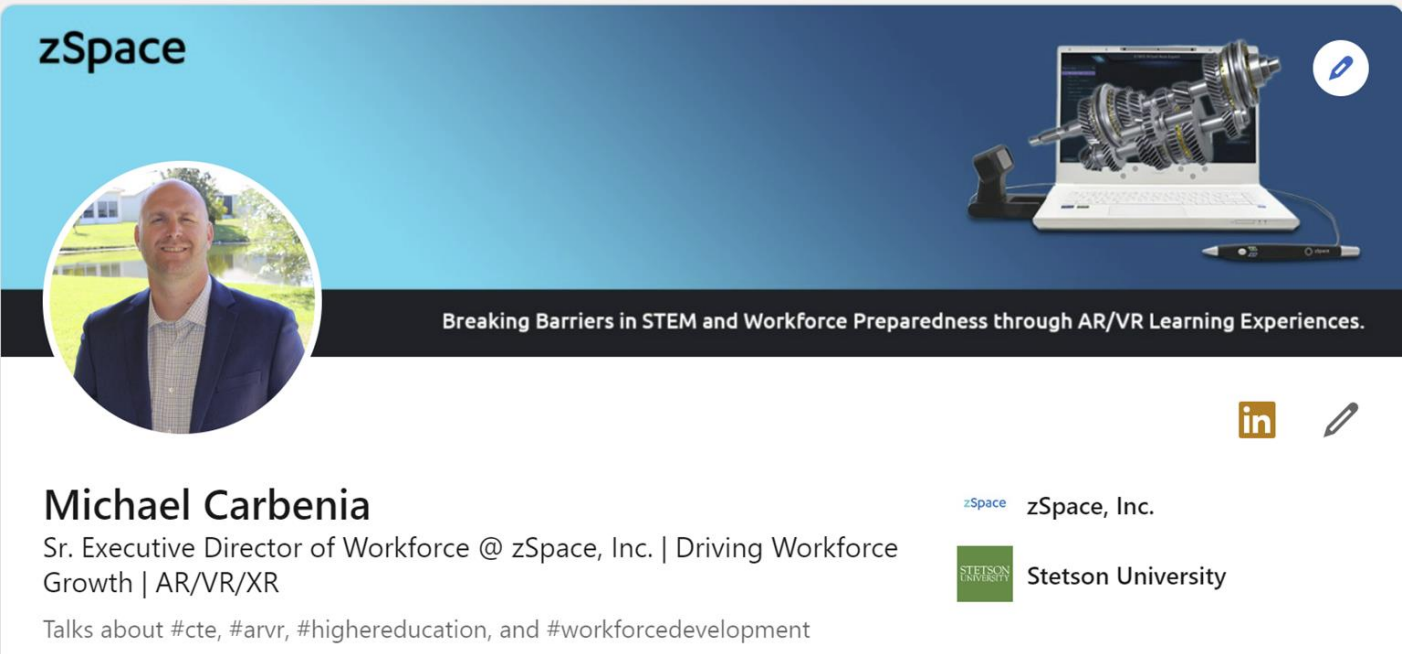
Enhancing Workforce Productivity with Artificial Intelligence and Augmented/Virtual Reality



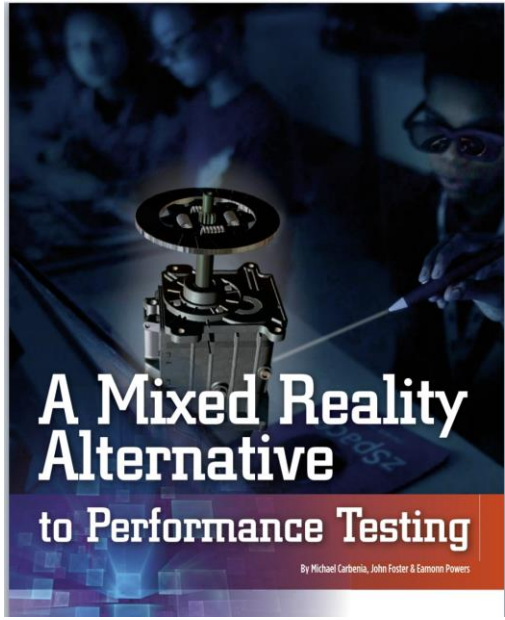
Michael Carbenia

Sr. Executive Director of Workforce @ zSpace, Inc. | Driving Workforce Growth | AR/VR/XR

Talks about #cte, #arvr, #highereducation, and #workforcedevelopment

zSpace, Inc.

Stetson University



How AR/VR Can Elevate Learning Experiences

By Carolyn Heinze (AVTechnology) published March 15, 2021

Michael Carbenia, executive director of career technical education (CTE) at zSpace, actually started out as a customer. Having grown up in the AV industry, Carbenia eventually pursued a career in education; prior to joining zSpace, he was the director of CTE for St. Lucie Public Schools in St. Lucie County, FL.

Every company is now a technology company

zSpace is an example of AR/VR that allows educators to do things that would otherwise be:

Dangerous, **I**mpossible, **C**ounterproductive, and/or, **E**xpensive

- Jeremy Bailenson, Ph.D., Director of Stanford University VR Lab

zSpace

Technology Landscape

Virtual Reality: HMDs

oculus

Samsung Gear VR

htc VIVE
VALVE

PlayStation.VR

Mixed Reality

zSpace

Microsoft HoloLens

Augmented Reality

METAVR

magic leap

Virtual Reality (VR)

Characteristics of VR

- Full immersion
- Isolation from surroundings
- Unique experience for each learner
- Delivered with a Head-Mounted Device (HMD)

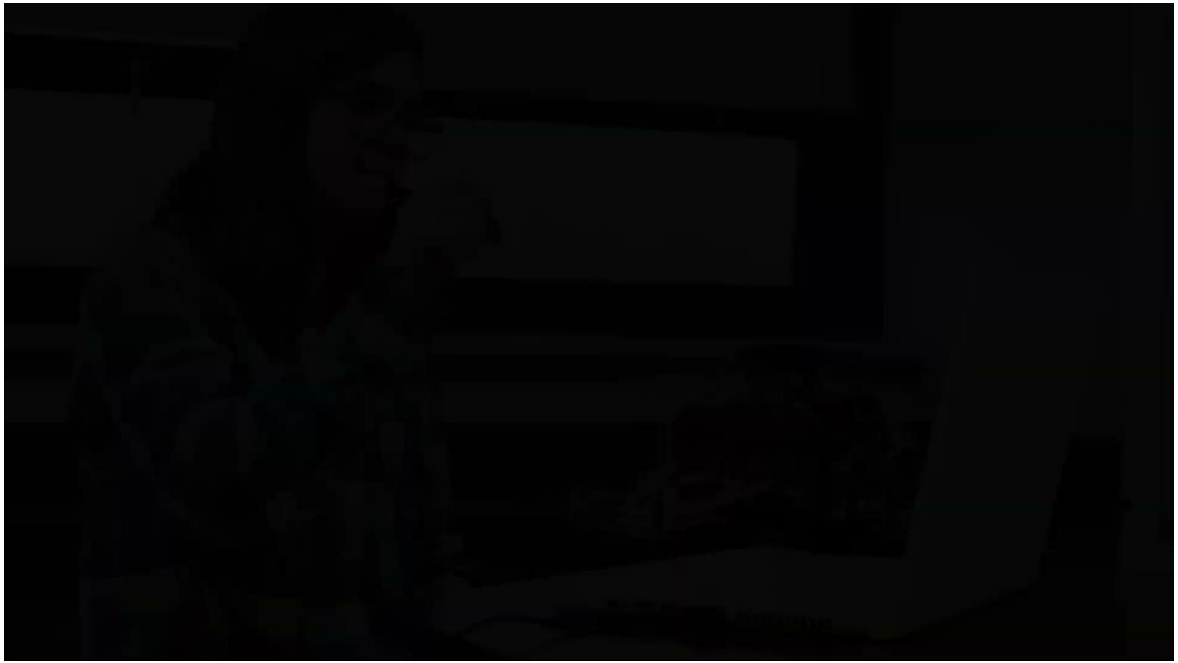
zSpace

Augmented Reality (AR)

Characteristics of AR

- Real world augmented with digital content
- Can be a shared experience
- Delivered using a tablet or other similar device and text or code to activate content

What is zSpace ?



Applications

zCentral

Experiences

zSpace Studio

Leopoly Maker

Newton's Park

Franklin's Lab

Euclid's Shapes

Curie's Elements

Activity Builder

zView

VIVED Anatomy

VIVED Science

VIVED Chemistry

Geogebra Classic

Human Anatomy Atlas

Virtual ECG

VR Automotive Expert by GTAFE

VR Automotive Mechanic by GTAFE

Canine Anatomy VR Trainer

VR Electric Automotive Mechanic

Tinkercad

Wave NG Welding

Labster Experiences

BlocksCAD3D

Advanced Manufacturing Hydraulics

Advanced Manufacturing Mechanical

Advanced Manufacturing Pneumatics

Industrial Robotics Expert

Industrial Robotics Mechanic

MEL Chemistry

[zSpace Apps Description]

MAY 16, 2020

Tesla reveals its plans to explore the use of augmented reality within its production lines

#Tesla #Technology #Connected Manufacturing #Smart Manufacturing

CATHERINE STURMAN | 2 MIN

How Ford is using Augmentative & Virtual Reality

October 26, 2020 // Marcela De Vivo

Designing cars

In order to create a more efficient and streamlined design process, **Ford has started using Microsoft's augmented reality tech**, HoloLens which can be used for commercial and industrial applications.

Maintenance and Technicians

Ford is also utilizing virtual reality to help with maintenance upkeep in cars and to assist technicians to repair vehicles, especially newer models that require more and more technological programming to repair.

In a partnership with automotive supplier Robert Bosch, **Ford will provide training for service technicians at dealerships to work on the new Mustang Mach-E electric crossover**.

6 Ways AR and VR Will Rule Construction in 2021

JANUARY 11, 2021 BY JOHN BIGGS

1. Training

Many jobs within construction involve heavy machinery, which can be dangerous without proper training. The obvious catch 22 here is that trainees need to gain experience using the equipment, but it's impractical or unsafe to train them on real equipment. With the margin of error so low in many real-world situations, it'd be best for workers to familiarize themselves with the controls and operation in a safe environment.

2. Remote Maintenance

AR lets workers share what they can see with an off-site expert, effectively allowing the experts to be in multiple places at once. By wearing a headset or a set of augmented reality goggles, workers in the field can get live guidance from technicians who are better equipped to identify problems when they can look through the worker's eyes.

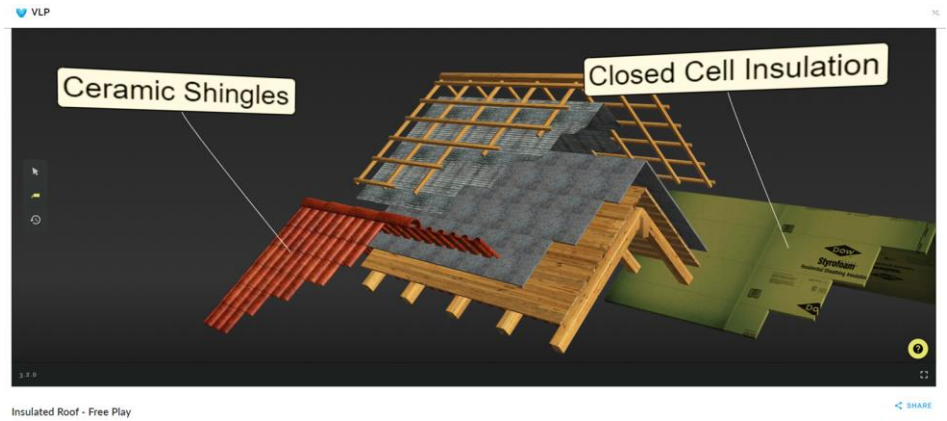
3. Design

4. Socially Distanced Jobsites

5. Attracting New Talent

Construction's skilled labor shortage is a well-documented fact. Seasoned industry veterans are retiring at a faster pace than young workers are stepping up to replace them. The industry is hoping to lure digitally native young workers with new technology. Young people today were practically born with a smart device in their hands, so they're more comfortable even with advanced technology than any previous generations.

6. Virtual Collaboration



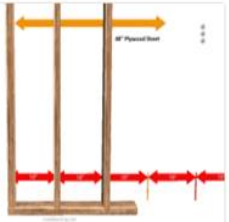
Construction Fundamentals

CONSTRUCTION COMPETENCIES EXAMPLES

- Demonstrate the importance of health, safety and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- Investigate the construction industry and explore related occupations.
- Select and use basic hand tools.
- Select and use power tools and describe their proper operation.
- Demonstrate mathematics knowledge and skills relevant to the construction industry.
- Read and interpret construction drawings.
- Frame floor systems based on drawing and specification requirements.
- Frame walls and ceilings based on drawing and specification requirements.
- Frame a roof based on drawing and specification requirements.

12 X 12 Square

VIVED Construction

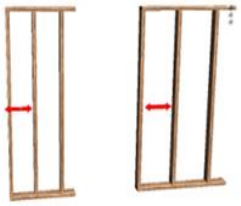


16" on center stud layout

VIVED Construction

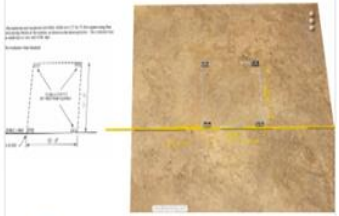
Building a Wall - Cull the Lumber

VIVED Construction



Building a Wall - Layout

VIVED Construction



Chalkline

VIVED Construction

Construction Tools

VIVED Construction

Demonstrate you can measure

VIVED Construction

Exterior Wall

VIVED Construction

Floor Blueprint

VIVED Construction

House Framing

VIVED Construction

VLP

All channels | St Landry Parish School | VIVED Construction for zSpace

16 Foot Tape Measure
VIVED Construction for zSpace

Aluminum Ladders
VIVED Construction for zSpace

California Corner V3
VIVED Construction for zSpace

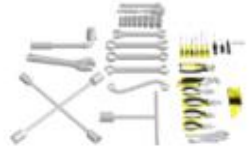
Chalk Wall Layout
VIVED Construction for zSpace

Chalkline
VIVED Construction for zSpace

Clamping Tools
VIVED Construction for zSpace

Cutting Tools
VIVED Construction for zSpace

Excavator
VIVED Construction for zSpace



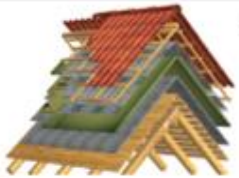
Fabrication Tools
VIVED Construction for zSpace

Floor System
VIVED Construction for zSpace

Hand Power Tools
VIVED Construction for zSpace

House Frame
VIVED Construction for zSpace

Impact / Fastening Tools
VIVED Construction for zSpace



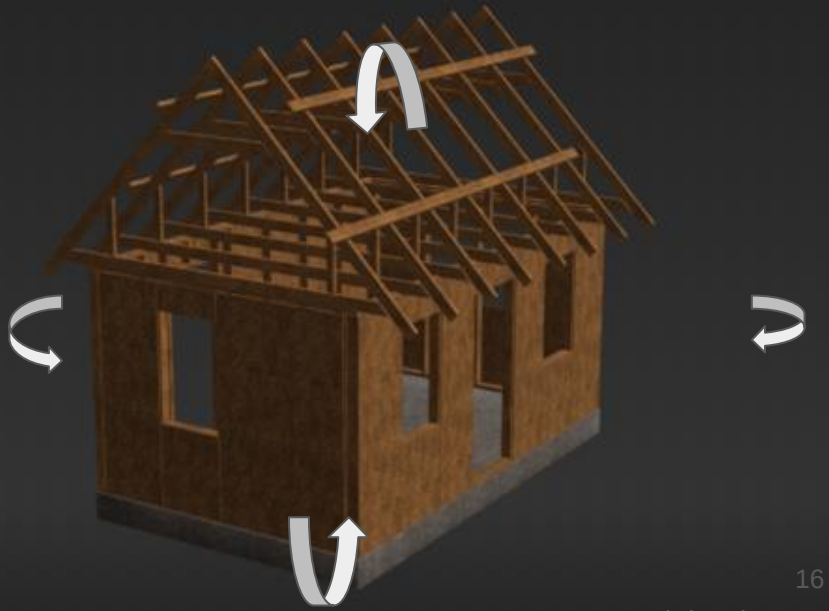
Insulated Roof
VIVED Construction for zSpace

Measuring Tools
VIVED Construction for zSpace

VLP

Intro

In this activity we will explore the important parts of how a house is framed



16

Slide advances models

3.10.0

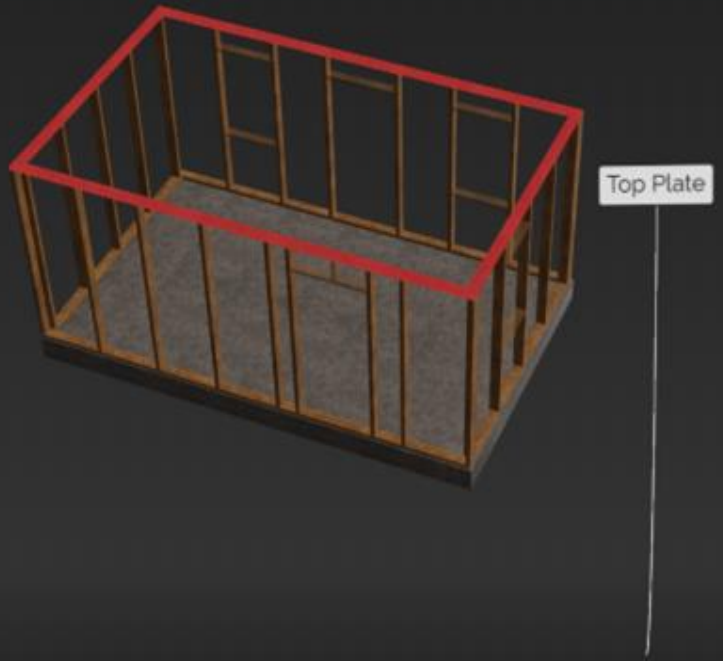
House Framing

SHARE

VLP

Top Plate

The Top Plate is a horizontal member of a frame wall supporting ceiling joists, rafters, or other members.



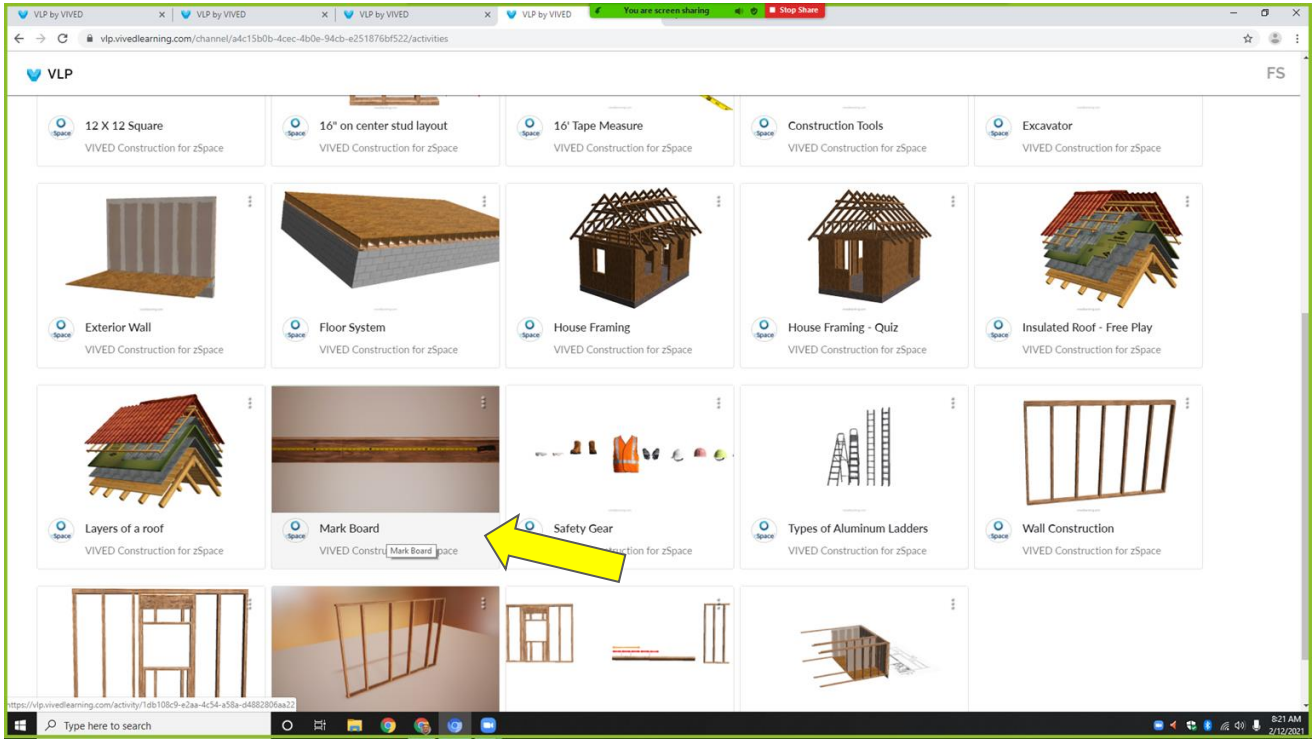
3.10.0

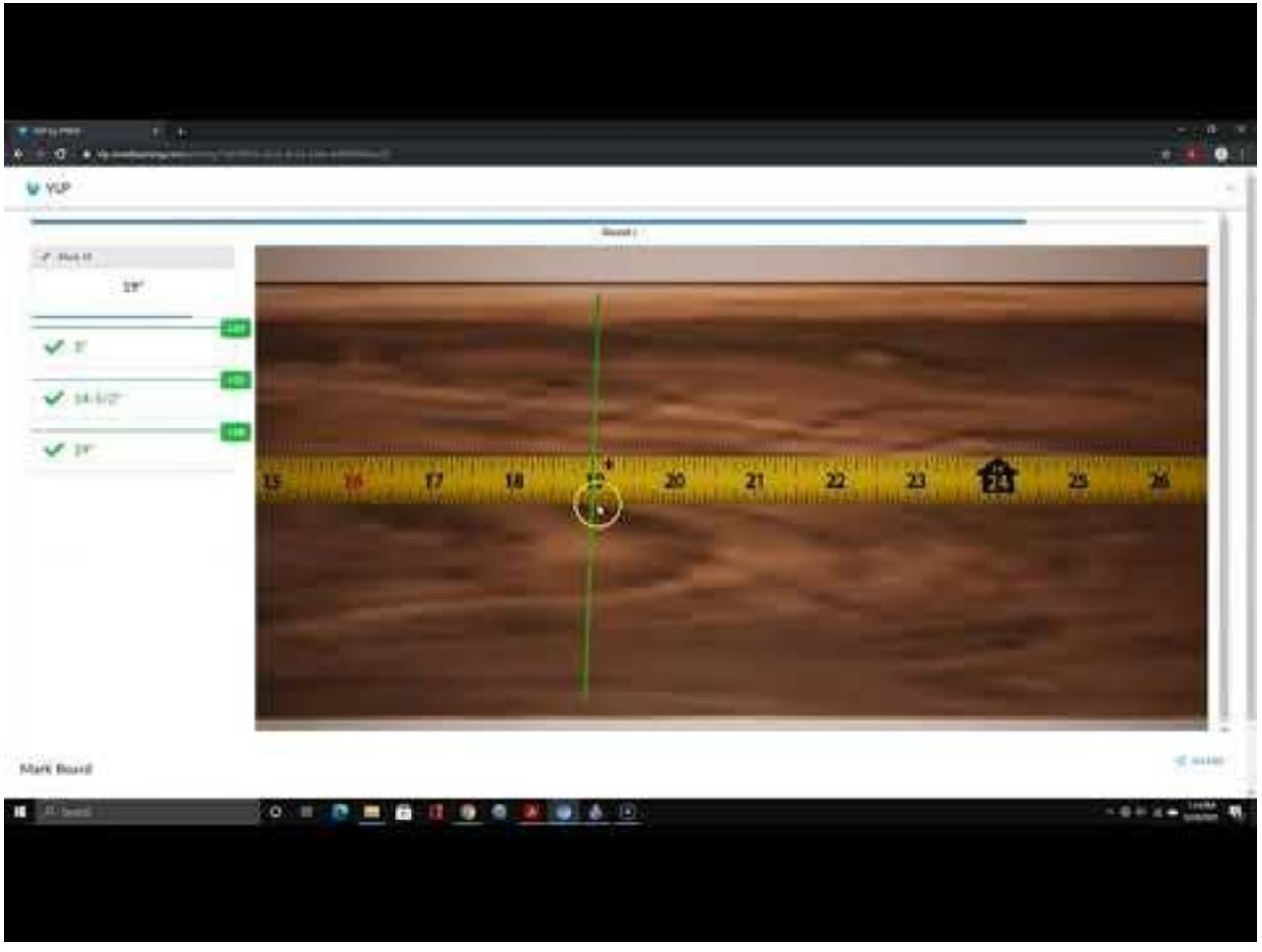
House Framing

SHARE

Search for anything

Mark the Board Activity




YLP
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Mark Board

NOCTI Partners with zSpace to Deliver AR/VR Training Aligned to Career and Technical Education Industry Certification Exams

zSpace Becomes First Augmented and Virtual Reality Product Endorsed by NOCTI

Local Partners

Local Partner #2

Landing page

15 HVAC Modules

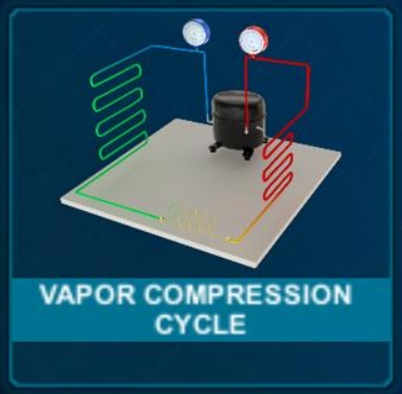
- HVAC Fundamentals
  - Vapor Compression Cycle
  - Pressure and Measurements
  - Heat, Temperature and Measurements

- HVAC Components/System
  - Reciprocating Hermetic Compressor
  - Evaporator, Air Cooled, Forced Air
  - Condenser, Air Cooled, Forced Air
  - Capillary Tube
  - Thermostatic Expansion Valve (TXV)
  - Filter Drier
  - Receiver
  - Accumulator

- HVAC Electrical Components and Systems
  - High-Low Pressure Manual Controls
  - High-Low Pressure Automatic

- HVAC Residential & Domestic System
  - Split Air Conditioning
  - Window Air Conditioning

- Modules contain: Background theory, technical simulations, 3D images and descriptions, Formative assessments



Learning Elements:

- Background Theory, consisting of the vapor compression cycle theory and supporting sciences.
- Description Parts in 3D, explain of Variate of temperature Chart, Heat and Cold region.
- Technical Simulation, simulated vapor compression cycle showing High/Low Pressure vapor and High/Low Pressure Liquid.
- Formative Assessment, consist 20 questions with final score, Number of Correct and Wrong Answer, Time taken.

Learning Objectives:

- Understand Basic Laws in Refrigeration.
- Understand Refrigeration Process in each main component.
- Understand Vapor Compression Cycle.
- Understand representation of P-H Diagram in vapor compression cycle.

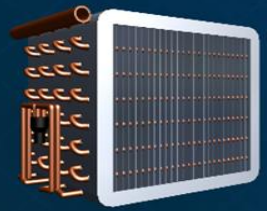
RECIPROCATING HERMETIC COMPRESSOR

Learning Elements:

- Background Theory, consisting of the Reciprocating Hermetic Compressor theory and supporting sciences.
- Description Parts in 3D, showing detail components of Hermetic Compressor with explode and combine features.
- Technical Simulations, 3D Simulation on how hermetic compressor work.
- Formative Assessment, consist 20 questions with final score, Number of Correct and Wrong Answer, Time taken.

Learning Objectives:

- Familiarization with refrigerant compressors.
- Identification of parts and components in reciprocating hermetic compressor.
- Understand construction of reciprocating hermetic compressor.
- Understand working principles of reciprocating hermetic compressor.



EVAPORATOR, AIR COOLED, FORCED AIR

Learning Elements:

- Background Theory, consisting of the Evaporator, Air cooled, Forced Air theory and supporting sciences.
- Description Parts in 3D, showing detail components of Evaporator in 3D model with the description.
- Technical Simulations, 3D simulation on how Evaporator work.
- Formative Assessment, consist 20 questions with final score, Number of Correct and Wrong Answer, Time taken.

Learning Objectives:

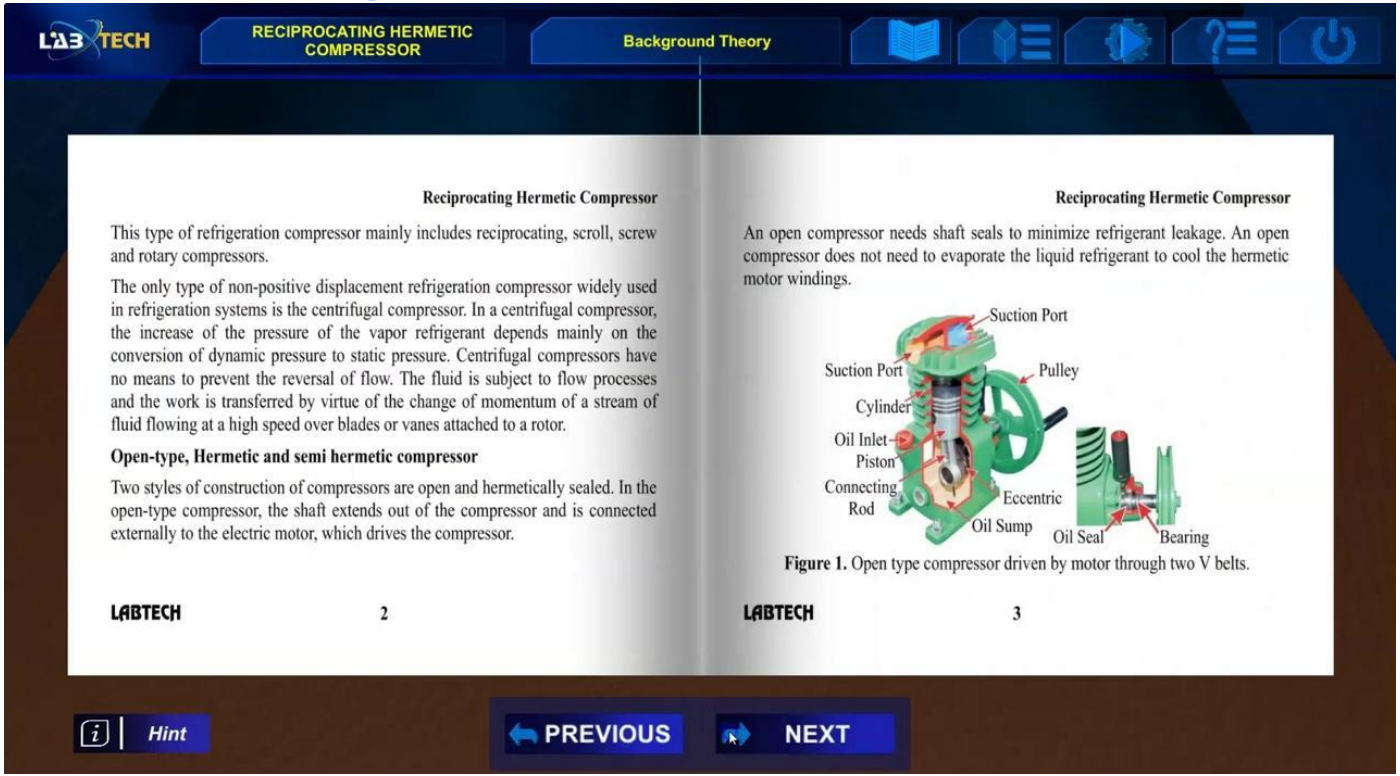
Introduction of Evaporator

- Double-Pipe Coolers
- Baudelot Coolers
- Tank-Type Cooler
- Shell-and-Coil Coolers
- Shell-and-Tube Chillers
- Direct and Indirect Systems

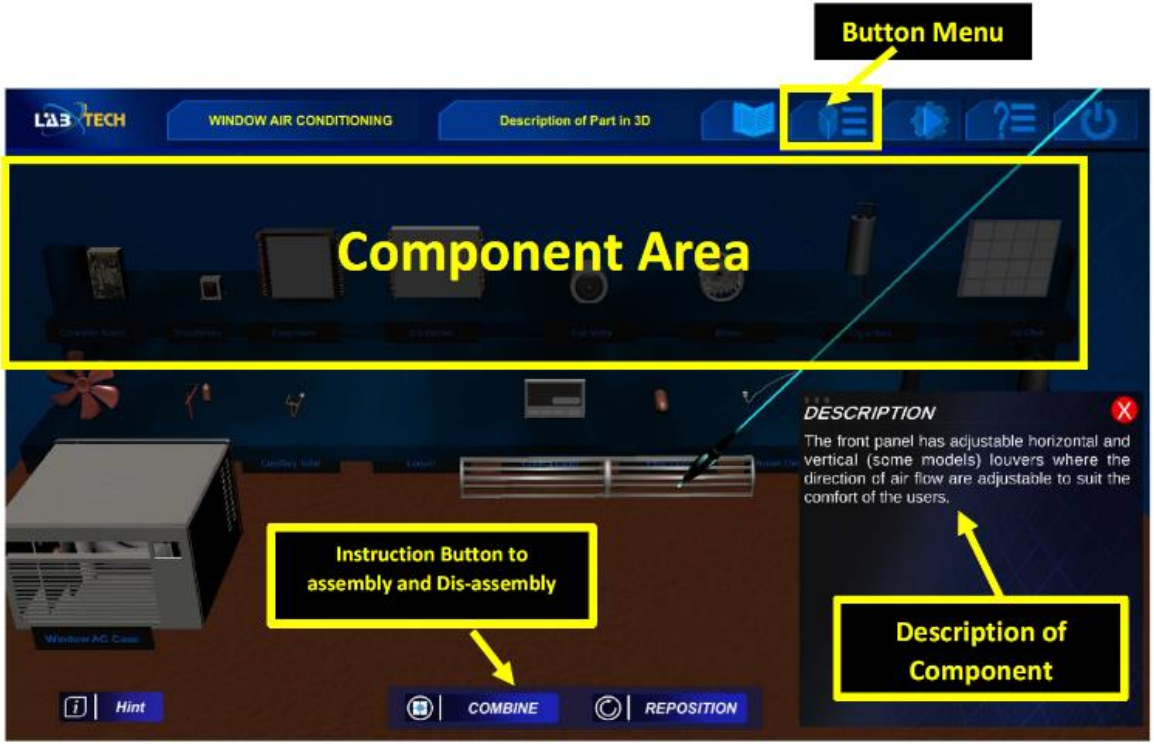
Evaporator Components

- Evaporator Coil
- Fin
- Distributor
- Evaporator Inlet
- Evaporator Outlet
- Evaporator Casing

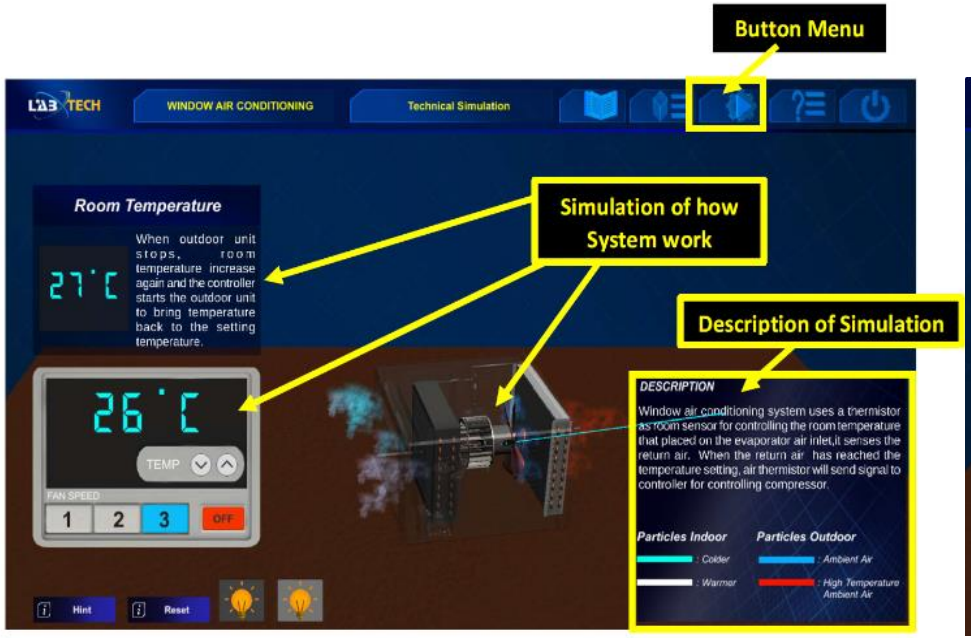
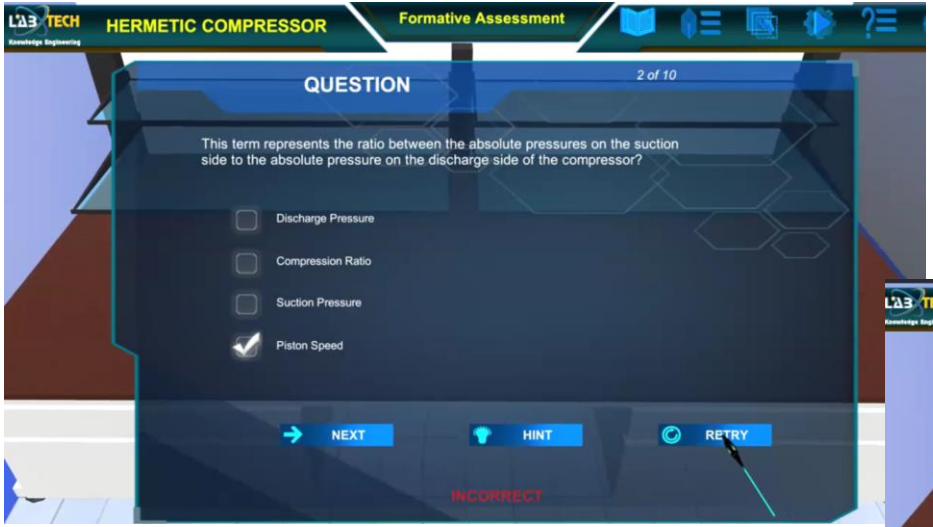
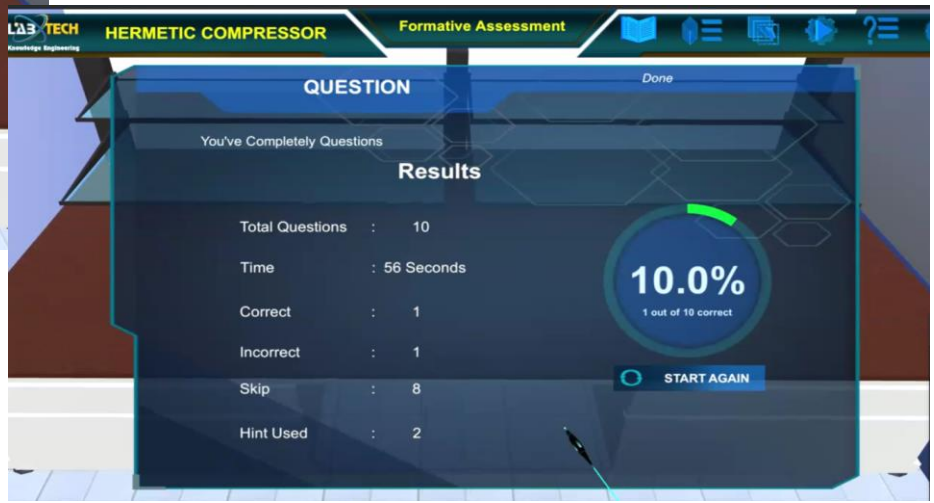
How to Navigate a Course



Description of Part in 3D



Technical Simulation



Formative Assessment