



Virtual and Augmented reality

For assembly



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This lecture ILO

- **Explain** suitable VR and AR implementations for assembly on a lean shop floor.
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What is VR?

- Combines multiple human–computer interfaces to provide various sensations (visual, haptic, auditory, etc.), which give the user a sense of presence in the virtual world.
 - The users are immersed in a computer-generated scene and interact using natural human motions.
 - The ultimate goal is to provide an “invisible interface” that allows the user to interact with the virtual environment as they would with the real world.
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VR state of the art





VR for assembly

- Virtual assembly
 - the capability to assemble virtual representations of physical models through simulating realistic environment behavior and part interaction to reduce the need for physical assembly prototyping resulting in the ability to make more encompassing design/assembly decisions in an immersive computer-generated environment
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Why VR in assembly?

- Virtual assembly **simulations** allow designers to import concepts into virtual environments during the early design stages and perform assembly/disassembly evaluations that would only be possible much later, when the first prototypes are built.
 - Virtual environments that address **various aspects of the product life cycle** such as ergonomics, workstation layout, tooling design, off-line training, maintenance, and serviceability prototyping
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Why VR in assembly?

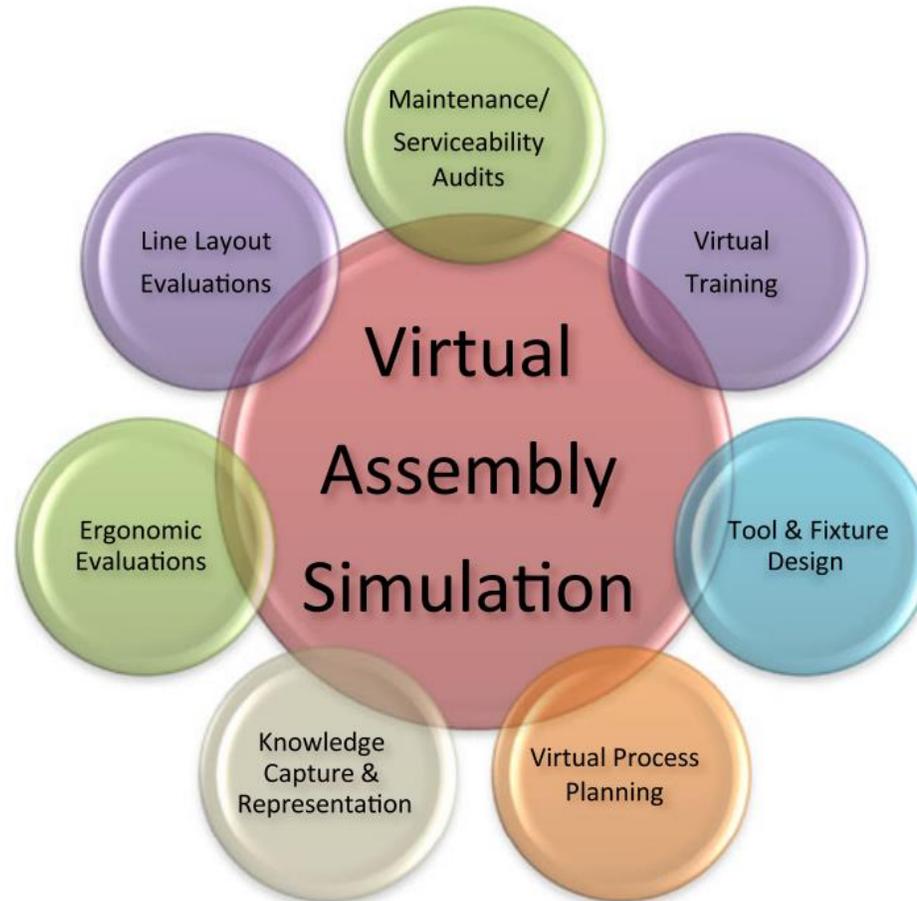
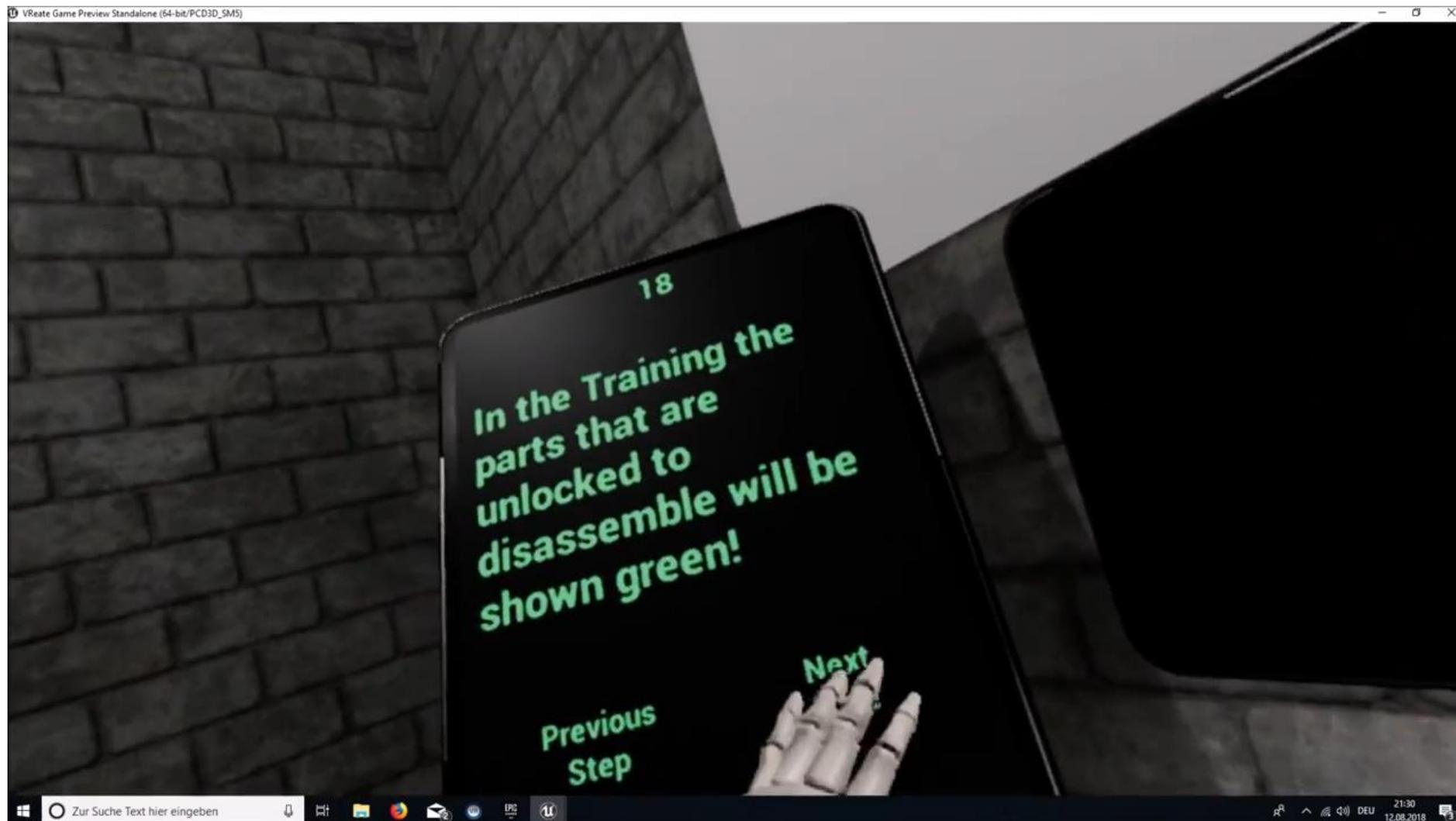
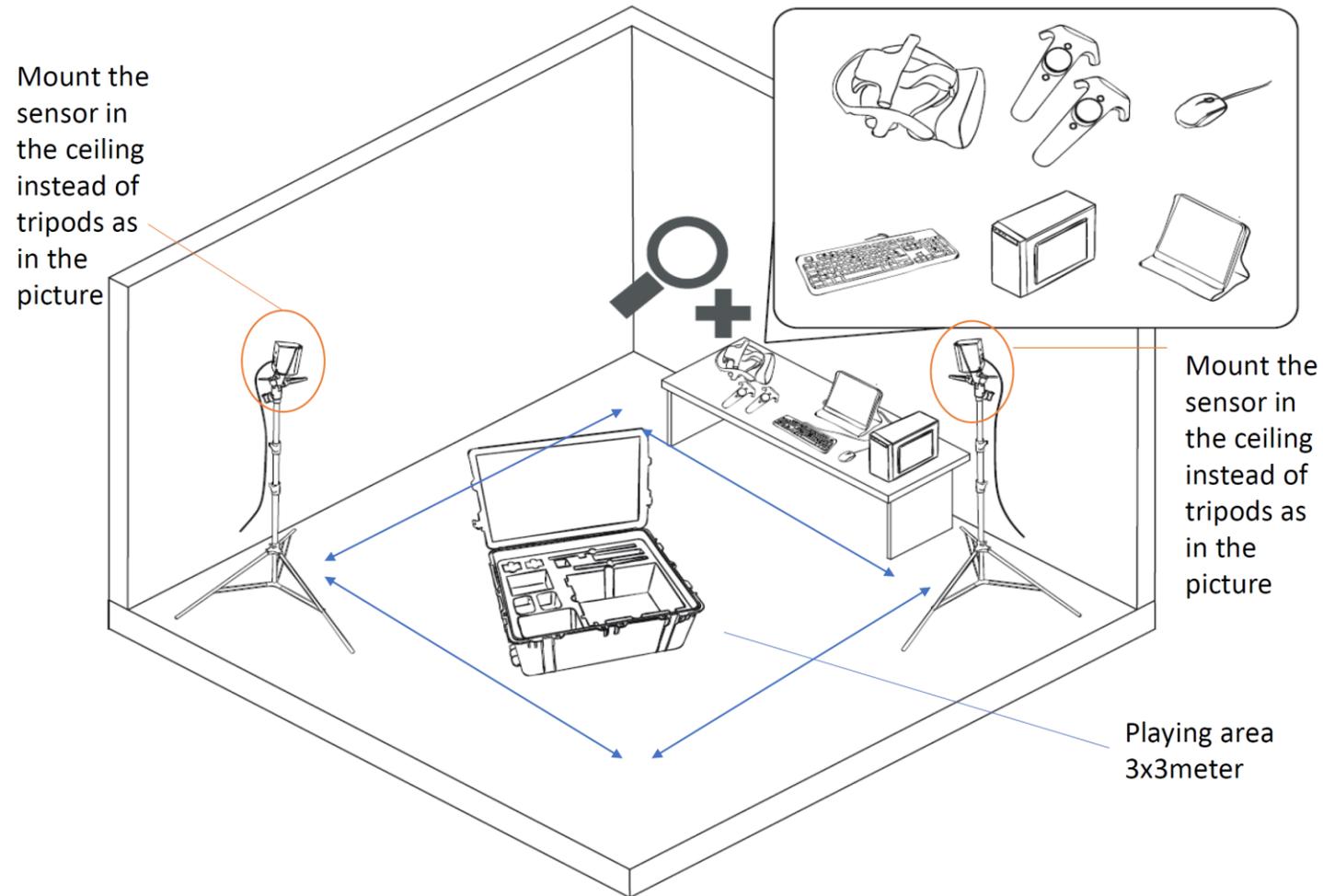


Fig. 1 Applications of a virtual assembly/disassembly simulation

VR example

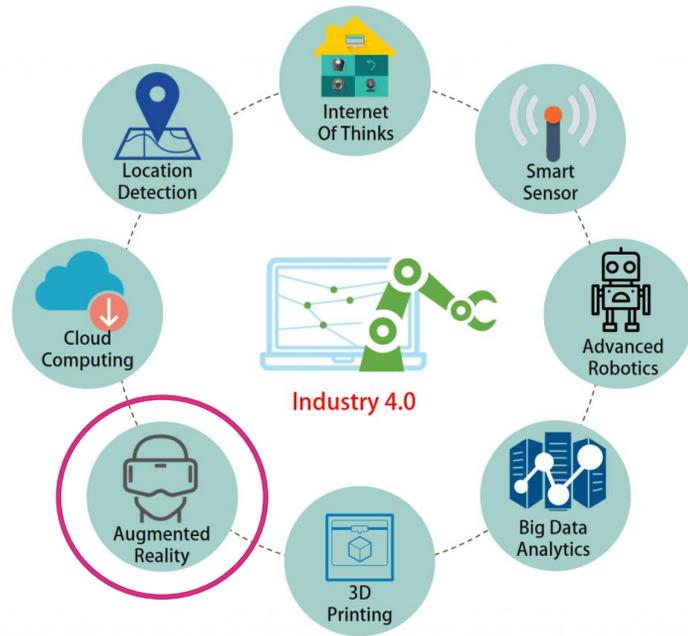


VR in our Lean lab



What is AR?

INDUSTRY 4.0 FRAMEWORK - THE DIGITAL TECHNOLOGIES

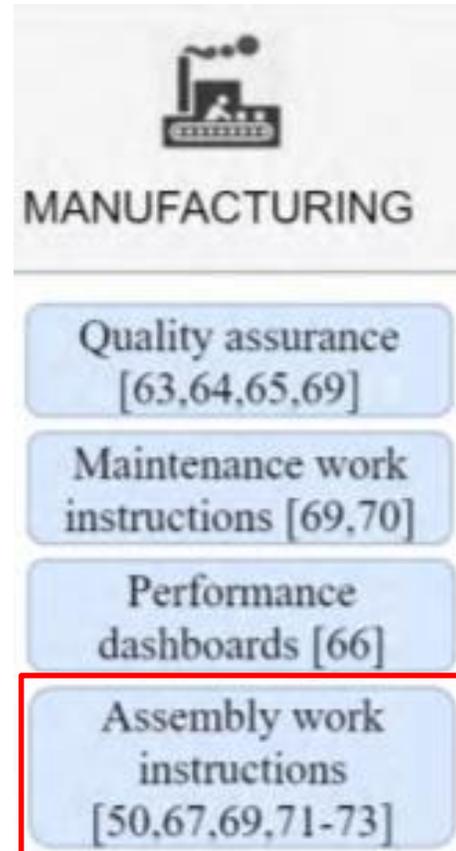


- AR is an Industry 4.0 enabling technology
- AR allows the view of real world environment to be “**augmented**” by computer-generated elements or objects
- AR **supplements** our world with digital objects of any sort, enhancing the human perception of the real-world environment.

AR state of the art

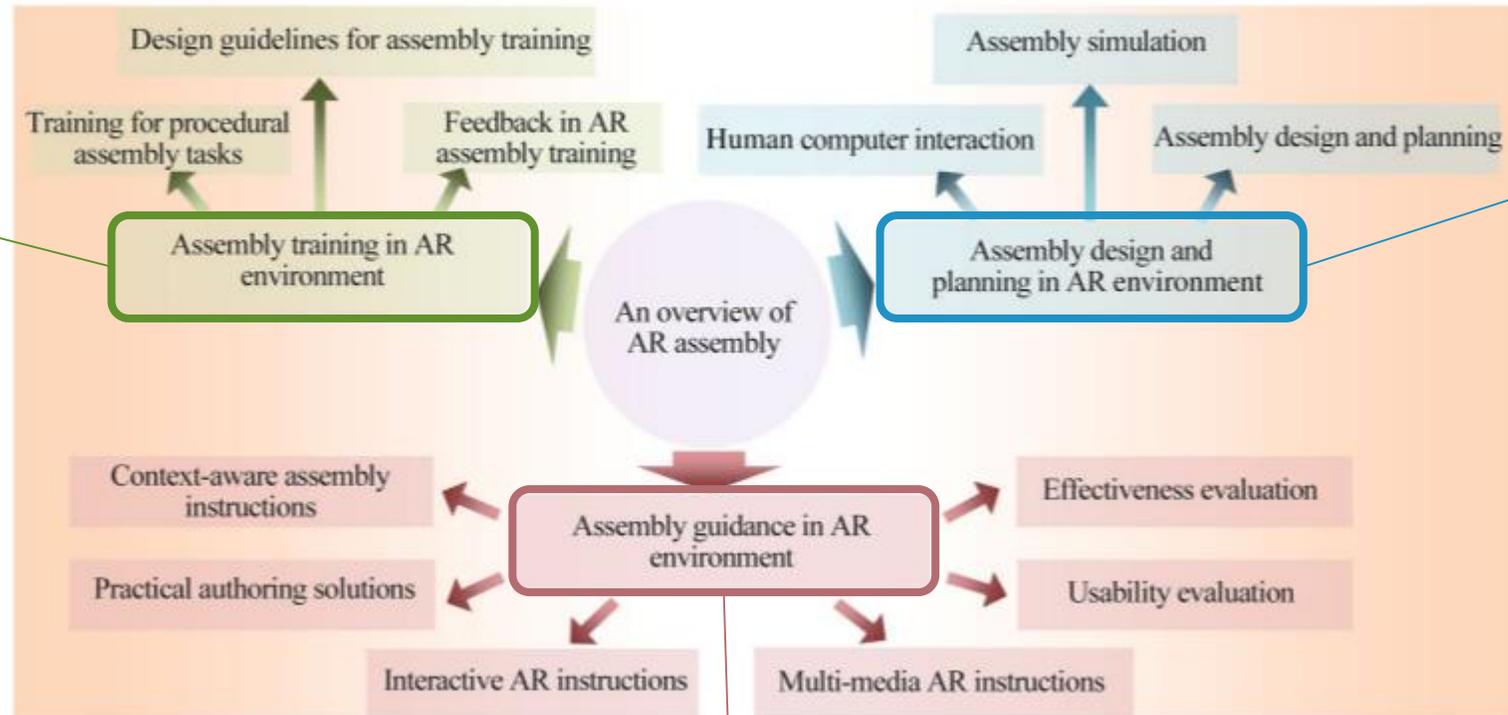


Why AR in manufacturing?



Why AR in assembly?

Teaching and learning new tasks. Possibility to directly support the operator during his tasks by providing him or her with detailed information on the assembly



Useful tool for design. It enables the simulation of assembly processes before they are performed.

Operator perform complex tasks interacting directly with machines. Images, text, and symbols are superimposed on the operator's visual field to facilitate communication and perception of the surrounding environment.

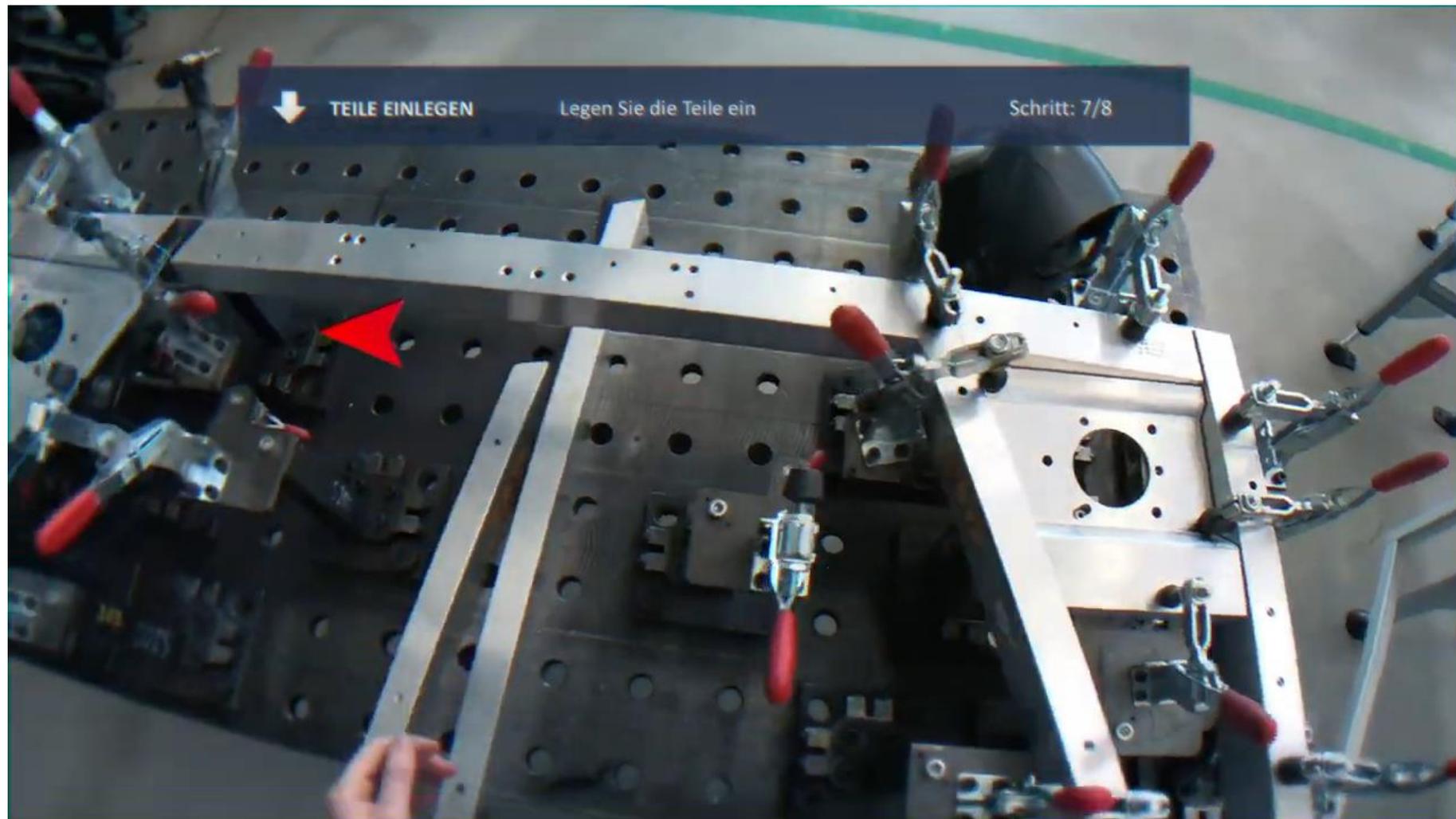
AR example



AR example



AR example



AR in our Lean Lab



AR and VR impact on Sustainability

4 QUALITY
EDUCATION



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



8 DECENT WORK AND
ECONOMIC GROWTH

