

Teaching and Learning at a Distance: Extended Reality in Education

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Research Center (Competence Center)

- founded in 2000 as **K_{plus}** center
- since 2010 funded by  **FFG** Forschung wirkt. as a **COMET** K1-center

Mission: R&D in Visual Computing

- bridge between science and industry

Organization: GmbH (Ltd. Co)

- located at Ares Tower in Vienna
- budget ~6.9 M€ (2019), ~70 FTE employees
- non-profit organization → profit is re-invested in research



Extended Reality **WAS** very expensive!

- Historically, XR has been used for expensive, high-risk simulations:
 - Flight simulators
 - Military simulators
 - Surgical simulators
 - Training of other expensive equipment:
 - Air traffic controllers
 - Supertanker pilots
 - ...

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Extended Reality is getting inexpensive!

- Today, high-quality XR can be a high-end gaming setup
 - High-end PC + VR-setup: about **€2.000,-**
- Entry-level XR can be done with a smartphone and hardware for about **€50,-!**

XR is not an expensive tool anymore!



Remote learning can be more than video

- Many topics will profit from 3D content:
 - Math: constructing in 3D
 - Physics, chemistry: simulated experiments, mechanical models
 - Biology: anatomical models, plants, animals
 - Art & history: virtual gallery / museum
 - Geography: terrain, geology, economic visualizations
 - And more...

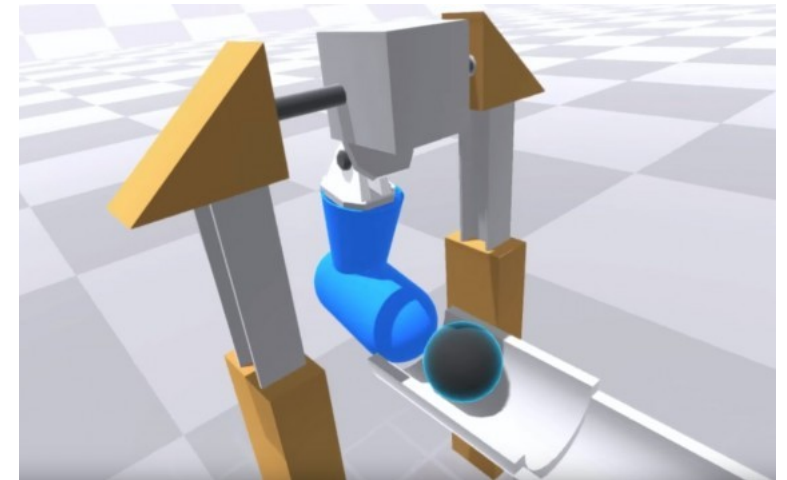
Where to get educational content?

- XR content is essentially video game content:
 - 3D models
 - Interactions
 - Simulations
- Video game content is expensive and economically feasible only in large numbers!



Content can be inexpensive!

- 3D reconstruction of real-world objects is easy with photogrammetry:
 - You just need a camera and a computer
- 3D modelling and painting allows a wide range of creative experiences
- A simulation sandbox, (e.g. for physics) enables many experiments without having to create each one separately



We need an impetus!

- Getting teachers to accept new possibilities
 - many of them are overwhelmed by video chats!
- Introductory hardware installation
 - Test setups for voluntary courses („naturwissenschaftliche Übungen“, STEM classes)



Contact me!

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