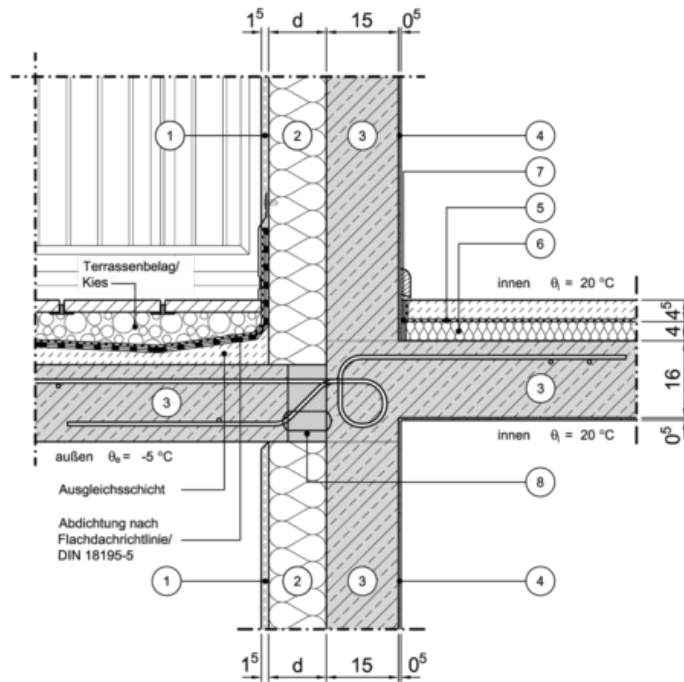


AR-supported Teaching

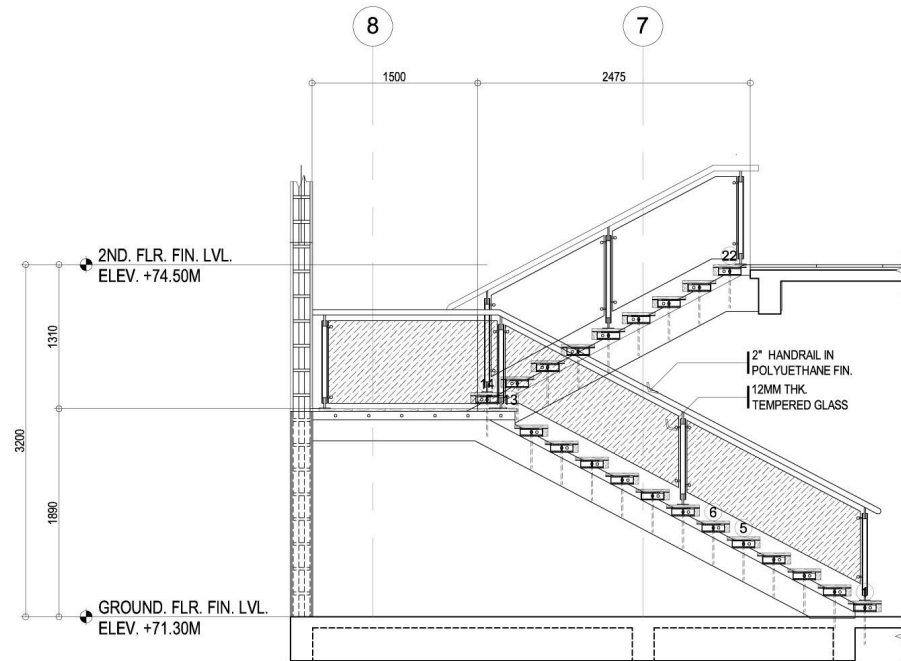
12.10.2022

Status quo

- Teaching uses mainly two-dimensional material, problems are three-dimensional



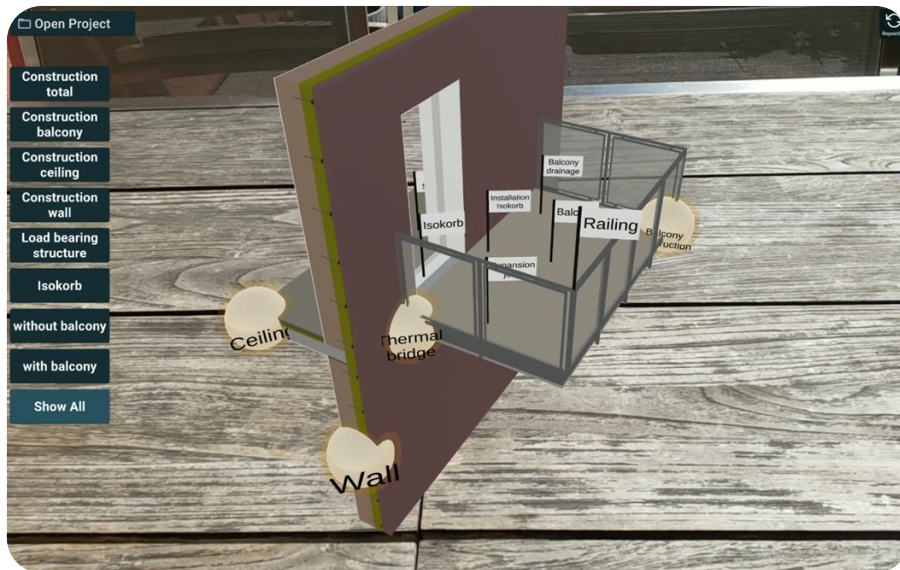
© InformationsZentrum Beton GmbH



© Meaw Chalida

Status quo

- Teaching uses mainly two-dimensional material, problems are three-dimensional
- ➡ Augmented Reality can help students to immerse in teaching scenes

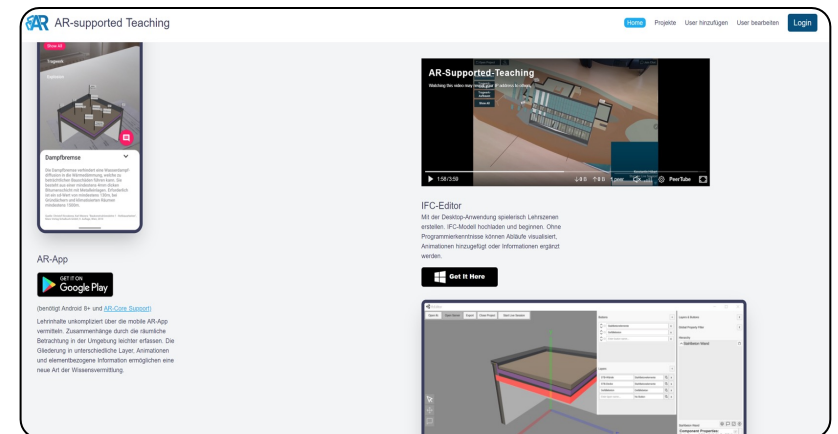
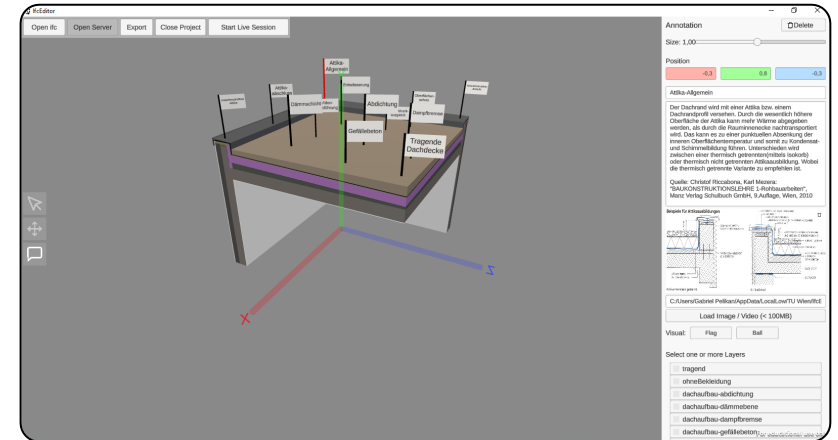
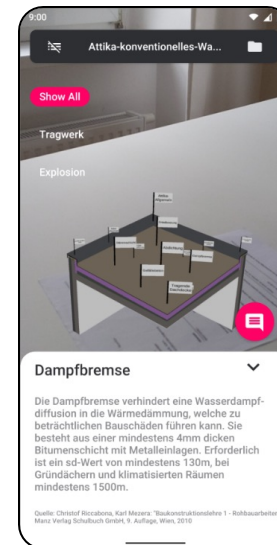


Status quo

- Teaching uses mainly two-dimensional material, problems are three-dimensional
 - ➡ Augmented Reality can help students to immerse in teaching scenes
- Current AR software solutions
 - closed eco-system
 - often require programming skills

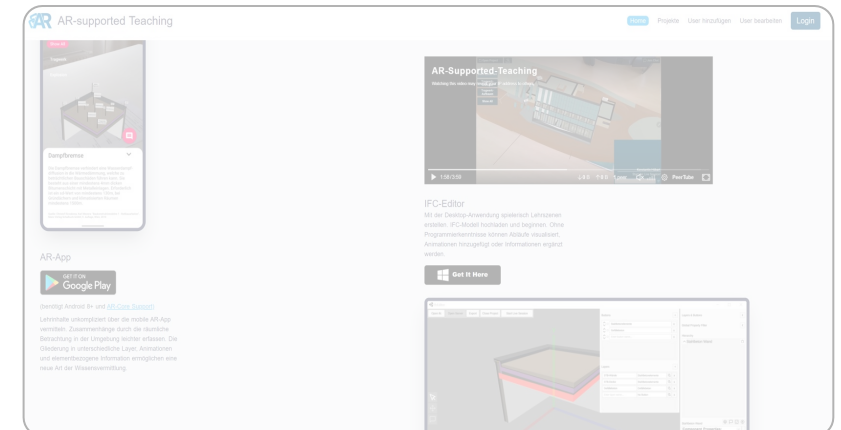
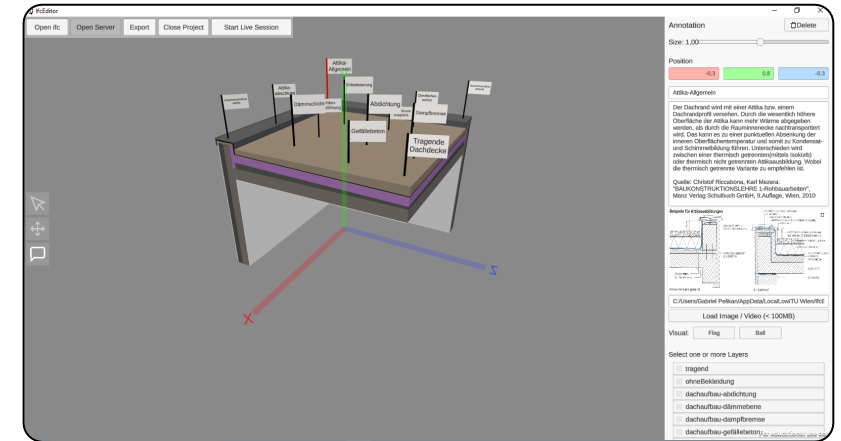
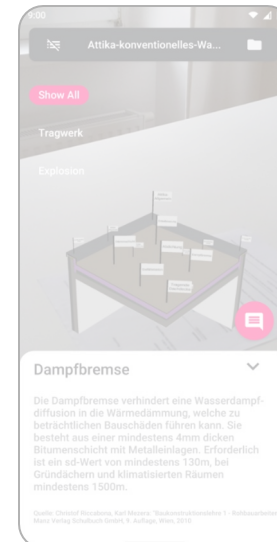
AR-supported Teaching

- AR platform for teachers and students
- uses IFC
- three applications



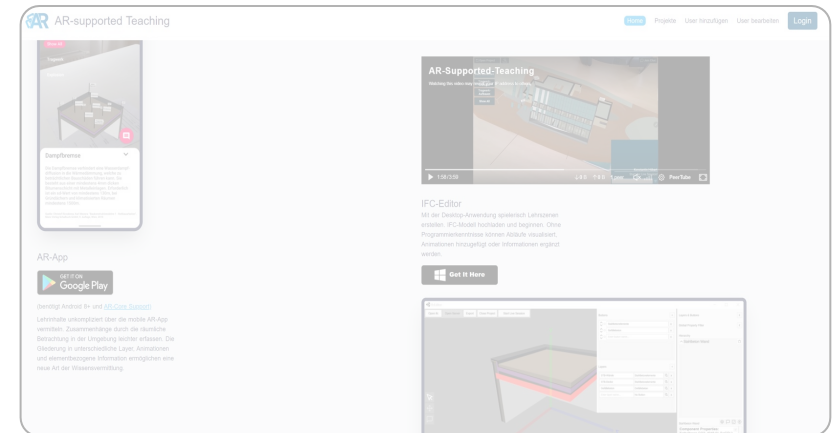
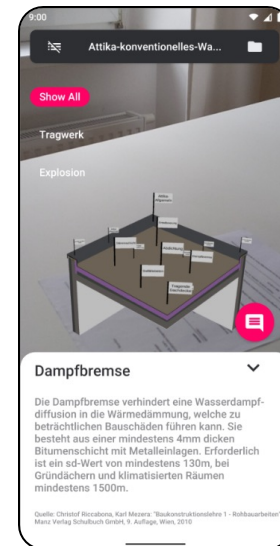
AR editor

- imports multiple IFC files
- enables the addition of didactic elements like:
 - animations
 - annotations
 - buttons and layers



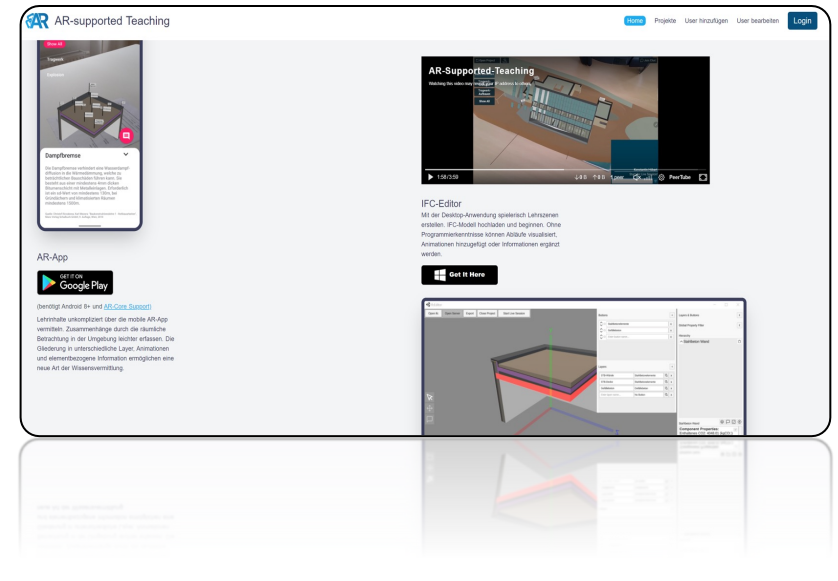
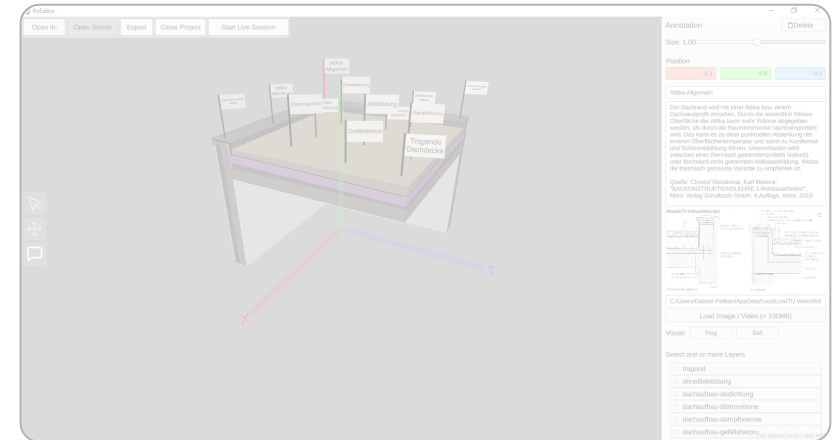
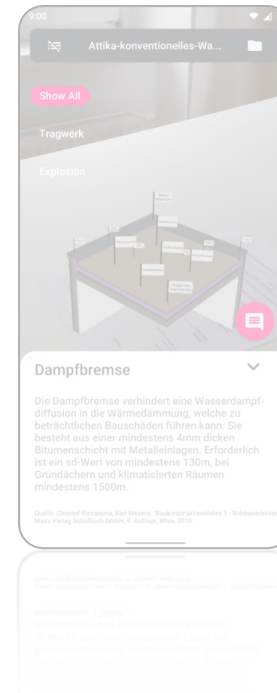
AR viewer

- for android devices
- view the scenes created in the AR editor
- live session to AR editor and other AR viewers (chat, voice, live pointer)



Website

- link between AR editor and AR viewer
- group management
- project management
- teaching scene overview



create model

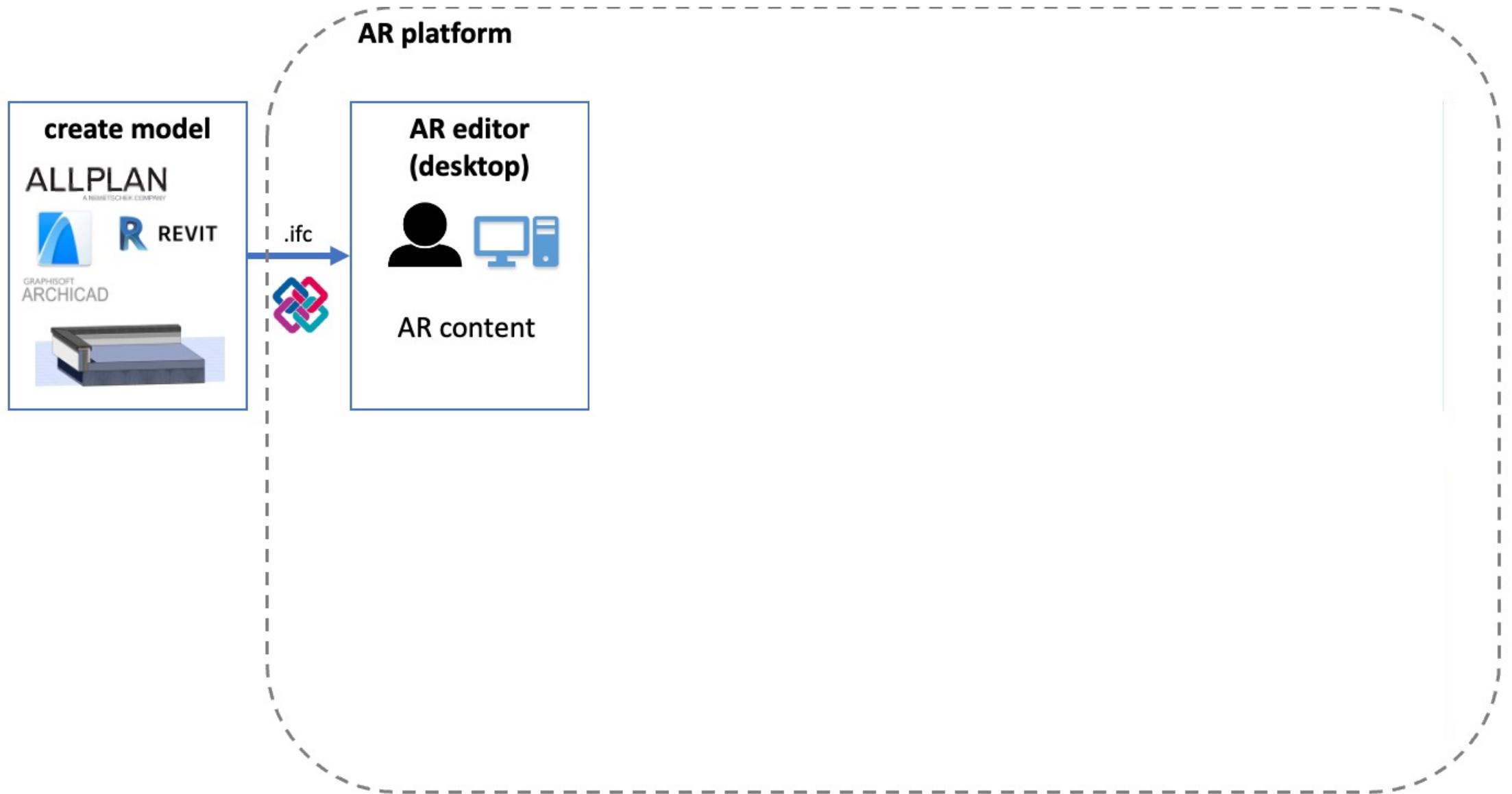
ALLPLAN
A NISWITTECH COMPANY

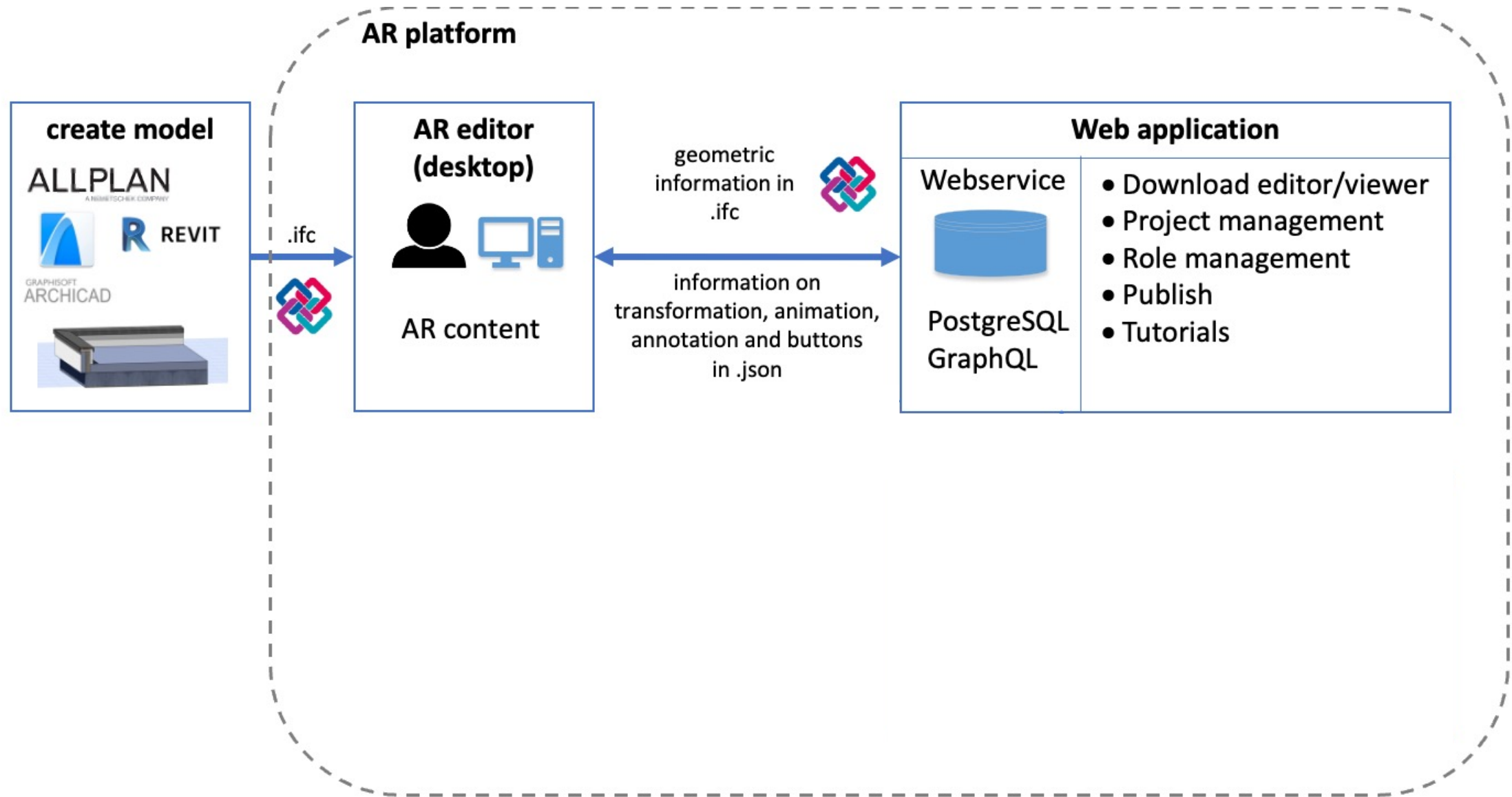


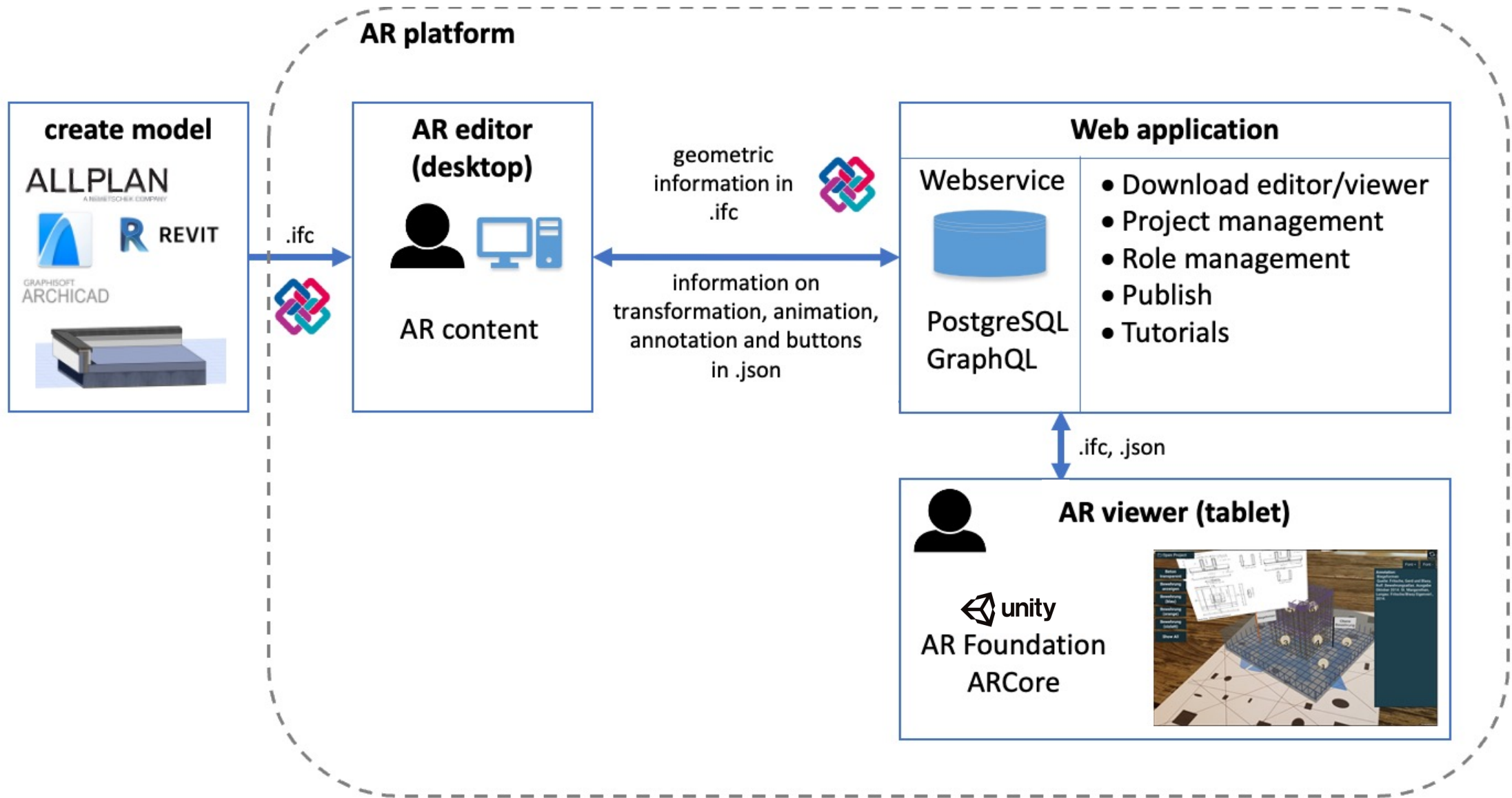
R REVIT

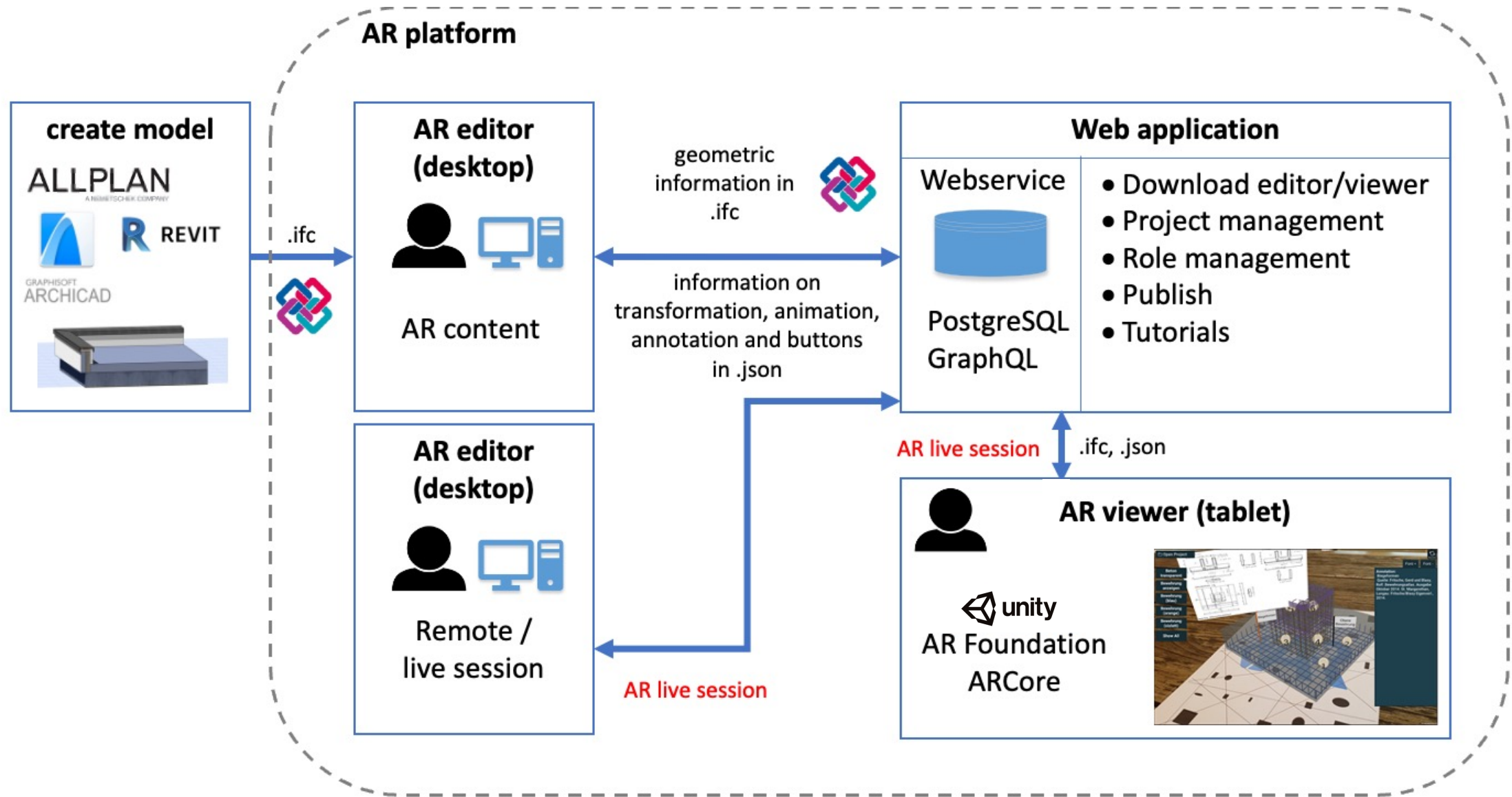
GRAPHISOFT
ARCHICAD













Half-timbered construction



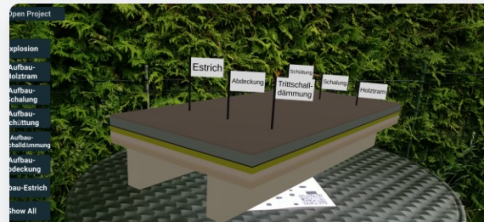
Frame construction



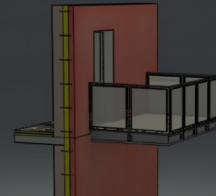
Transom construction



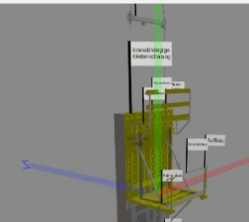
Skeleton construction



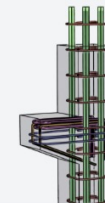
Wooden truss ceiling
with visible support structure



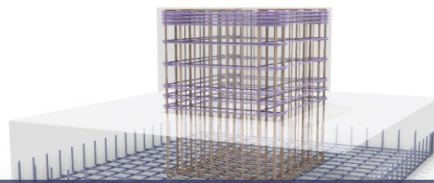
Isokorb/balcony insulation
Reference: • Schöck Bauteile Ges (...)



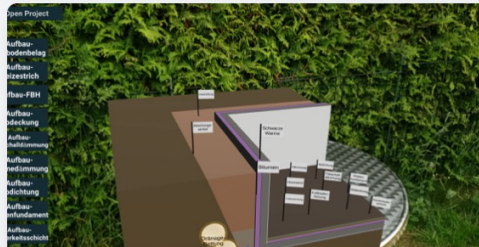
Climbing formwork
unguided; hanging freely from the crane



Concrete bracket reinforcement
Reference: Fritsche, Gerd und Blasy, Rolf (...)



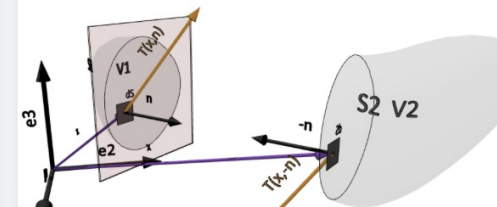
Sleeve foundation
Reference: Fritsche, Gerd und Blasy, Rolf (...)



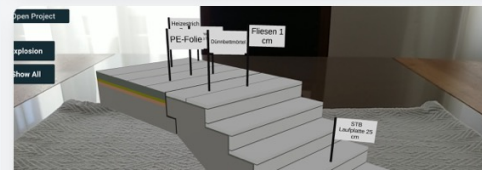
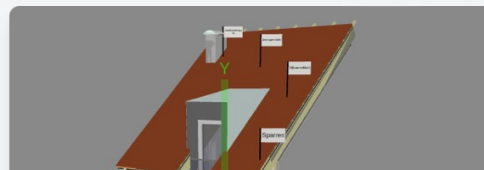
Foundation plate



Concrete pillar
Reference: Fritsche, Gerd und Blasy, Rolf (...)



Free-body principle

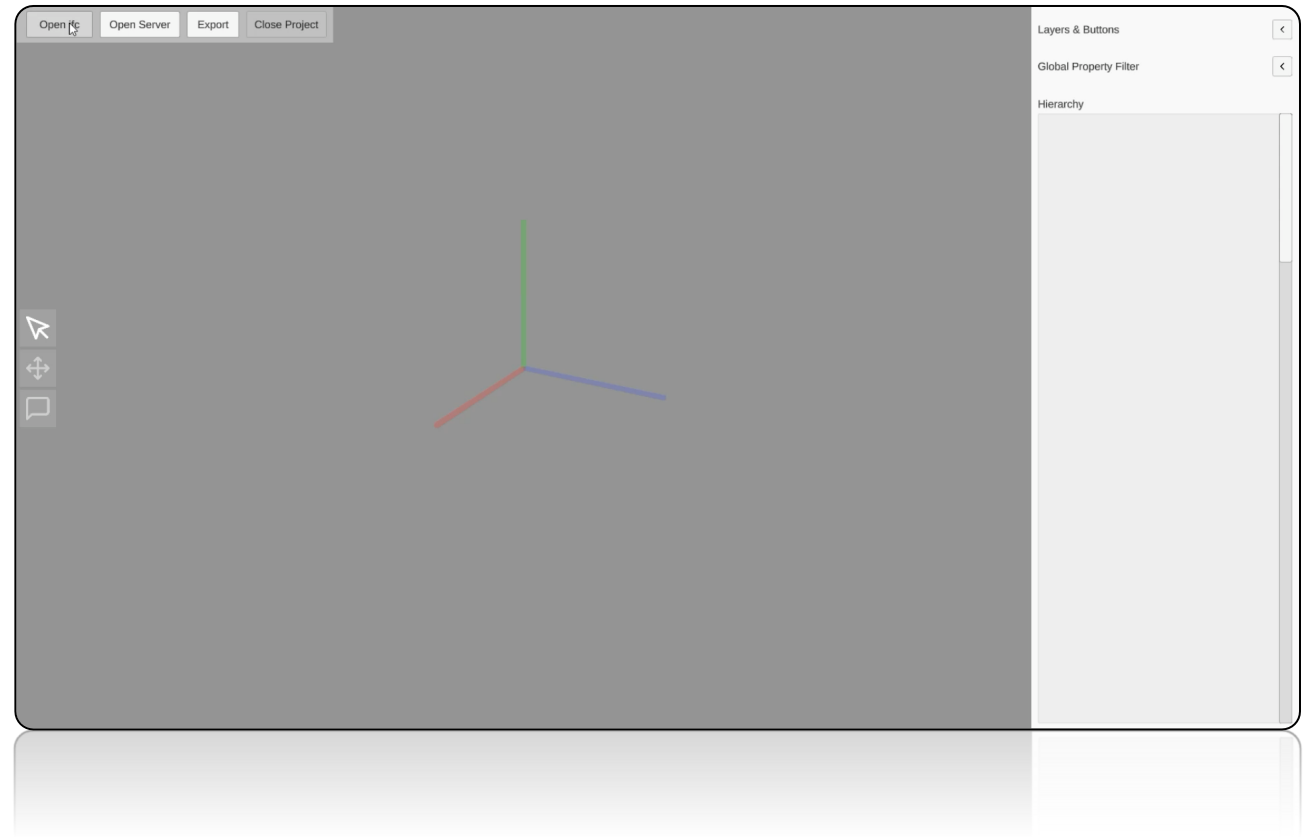


Key openBIM Information

- IFC as import option → software-independent environment
- Teaching scenes are stored as IFC files → long-lasting support
- Students learn how to work with openBIM and AR
- Multipurpose of openBIM

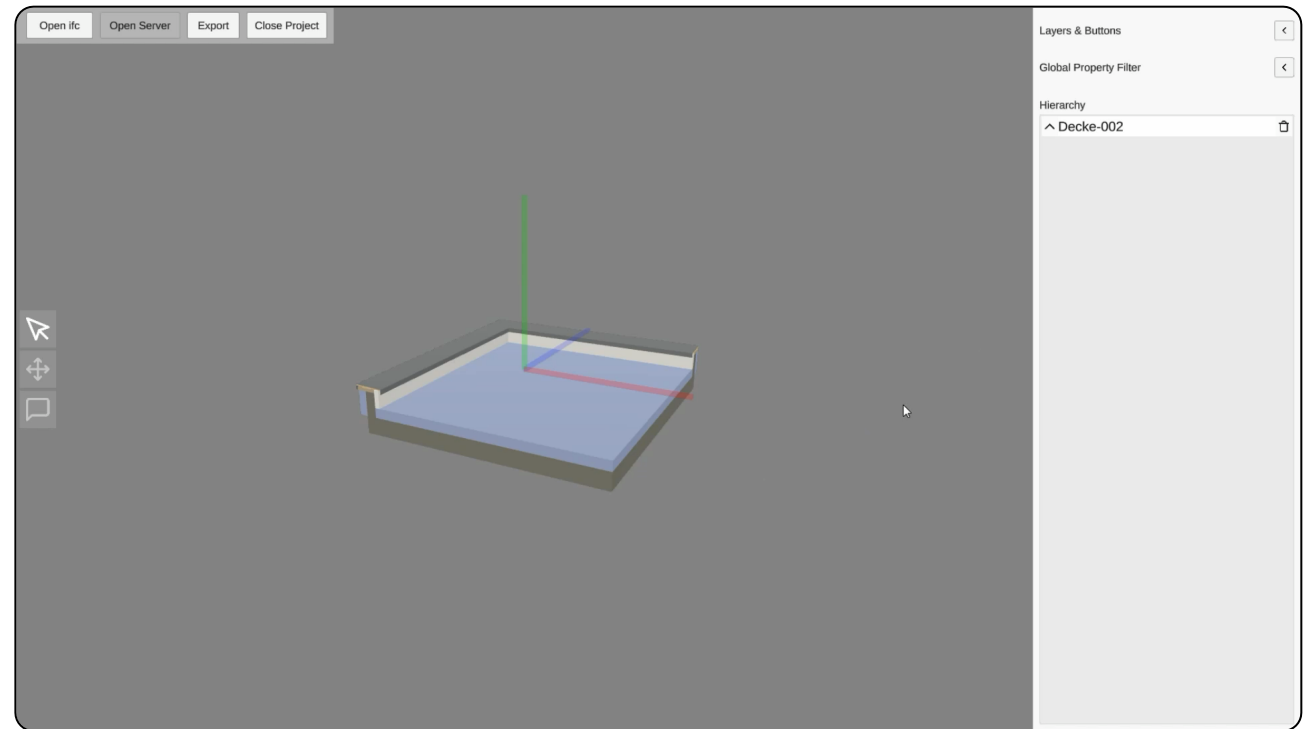
Key Outcomes – AR editor

- IFC data



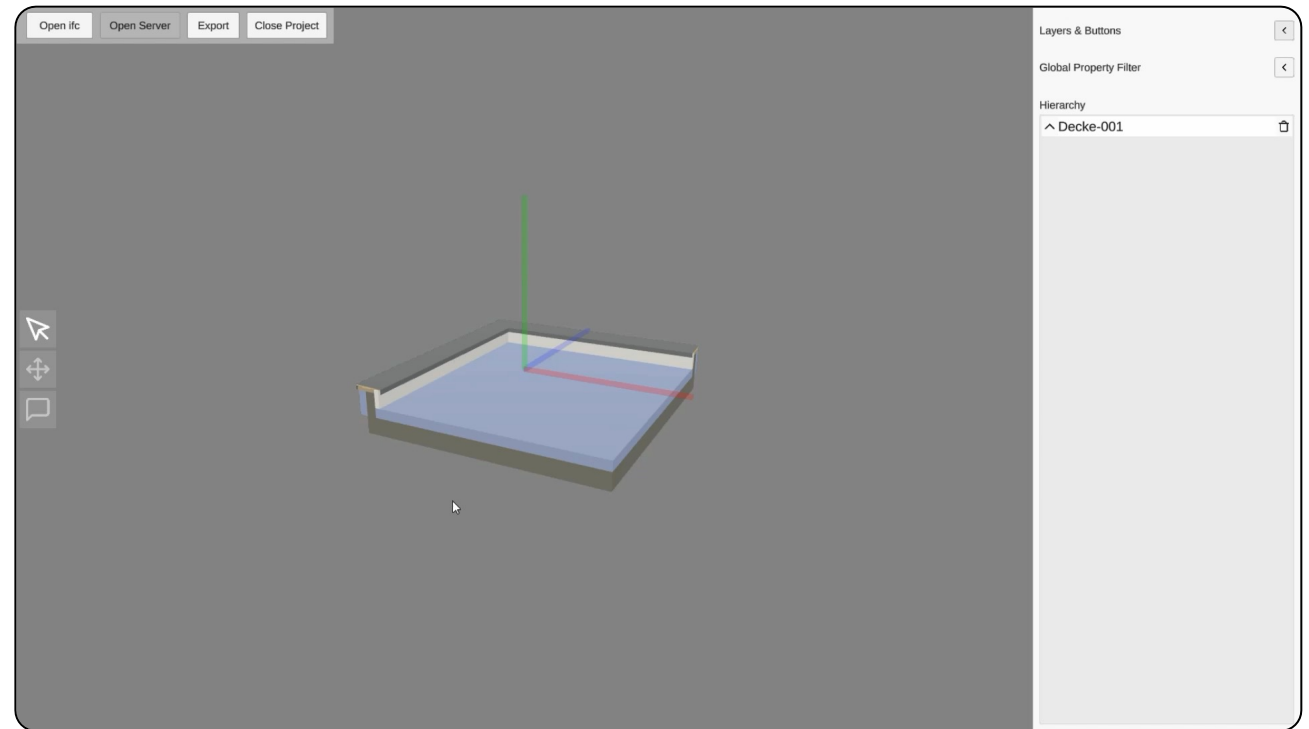
Key Outcomes – AR editor

- IFC data
- Buttons and Layers

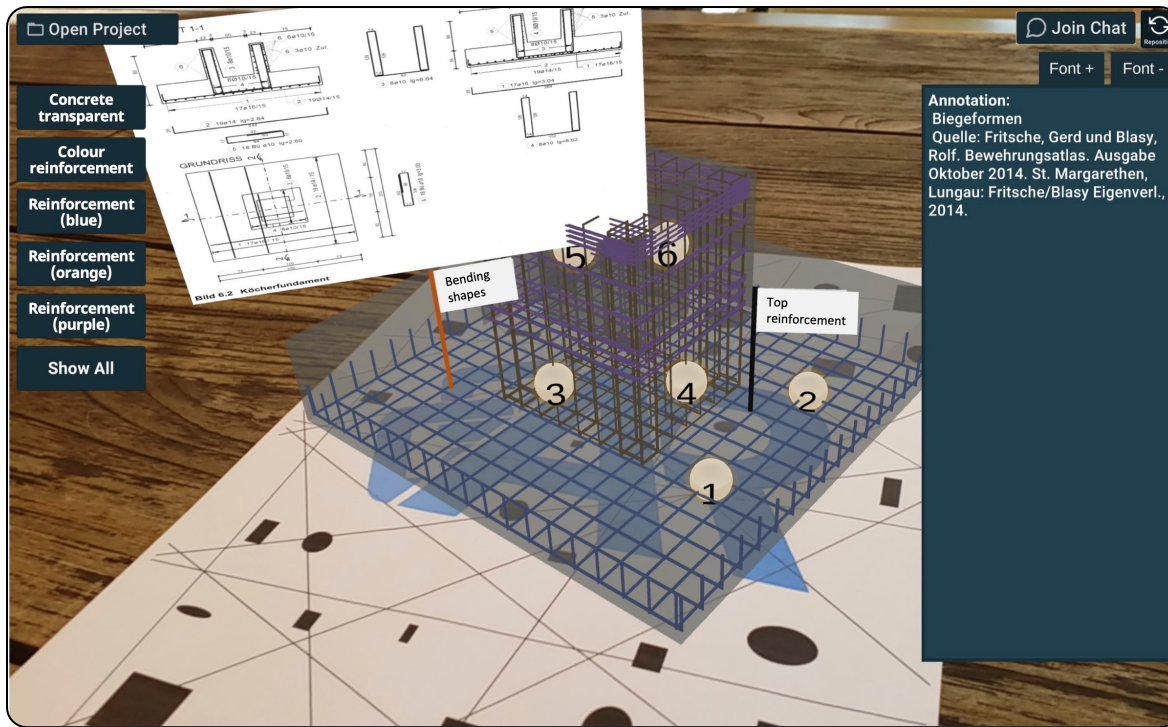


Key Outcomes – AR editor

- IFC data
- Buttons and Layers
- Annotations



Key Outcomes – AR viewer



Key Outcomes – Evaluation

HARUS-Score¹ AR Viewer



SUS-Score² AR Editor



„Can AR increase the learning effect?“



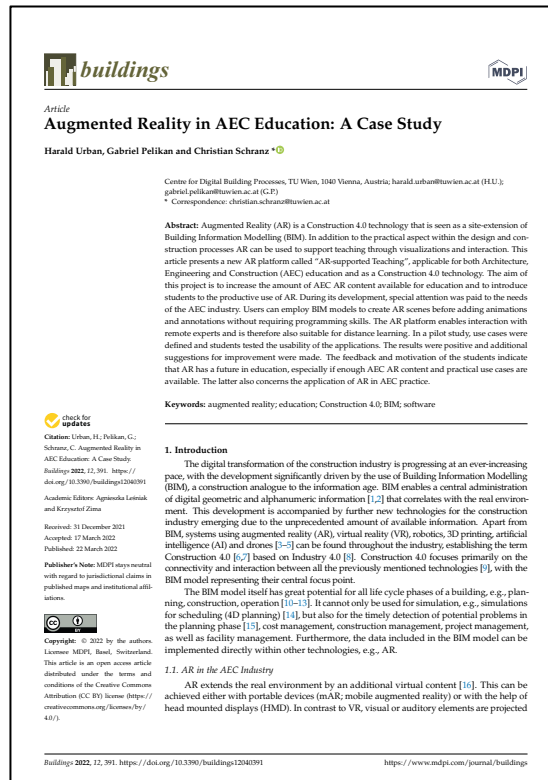
¹ „Handheld Augmented Reality Usability Scale“

² „System Usability Scale“

Key Outcomes – Publication

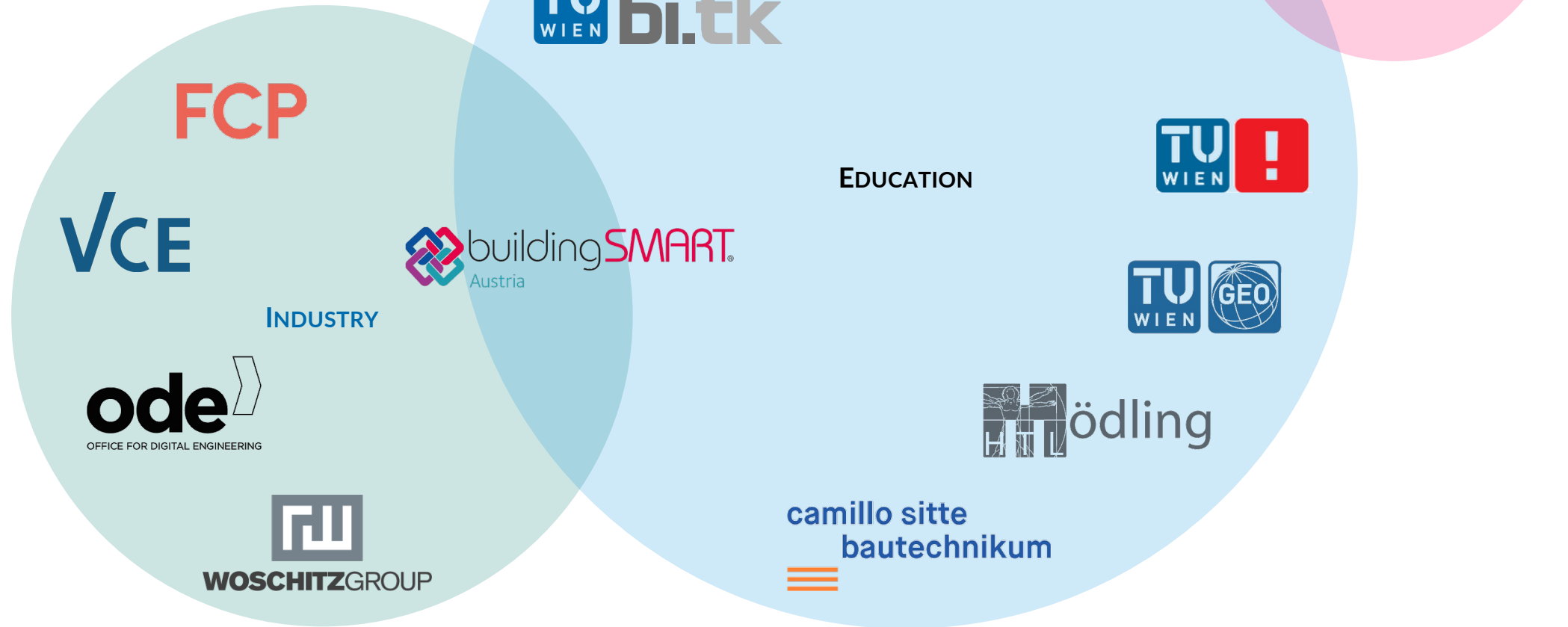
Augmented Reality in AEC Education: A Case Study

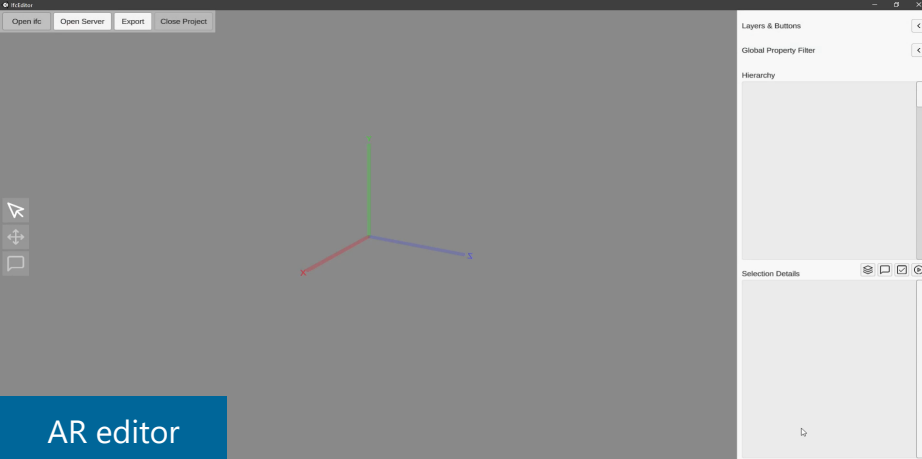
<https://doi.org/10.3390/buildings12040391>



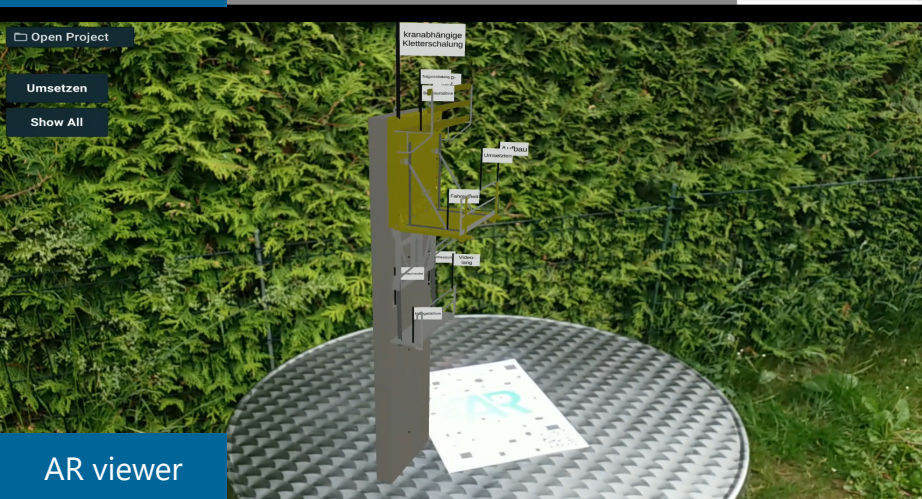


Key Participants



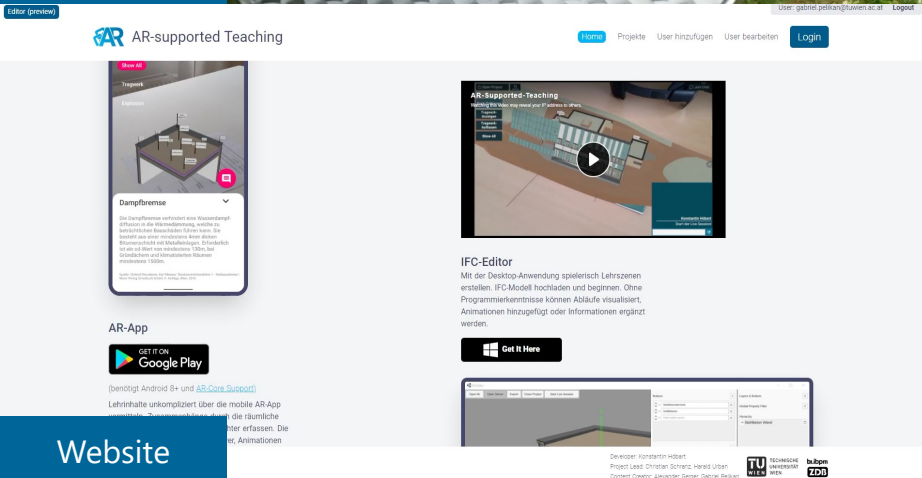


AR editor



AR viewer

AR-supported Teaching



Website



Developer:

Konstantin Höbart

Project Lead:

Prof. Christian Schranz

Dr. Harald Urban

Content Creator:

Alexander Gerger

Gabriel Pelikan

Digital Building Process

TU Wien

Karlsplatz 13/235-03

1040 Vienna, Austria

<https://www.tuwien.at/en/cee/ibb/zdb>

zdb.ar@tuwien.ac.at