Faculty-based design of Virtual Laboratory applications for Large-Scale Use

Prof.dr. Harry Bitter (WUR)

Dr. Koos van der Kolk (LabBuddy)

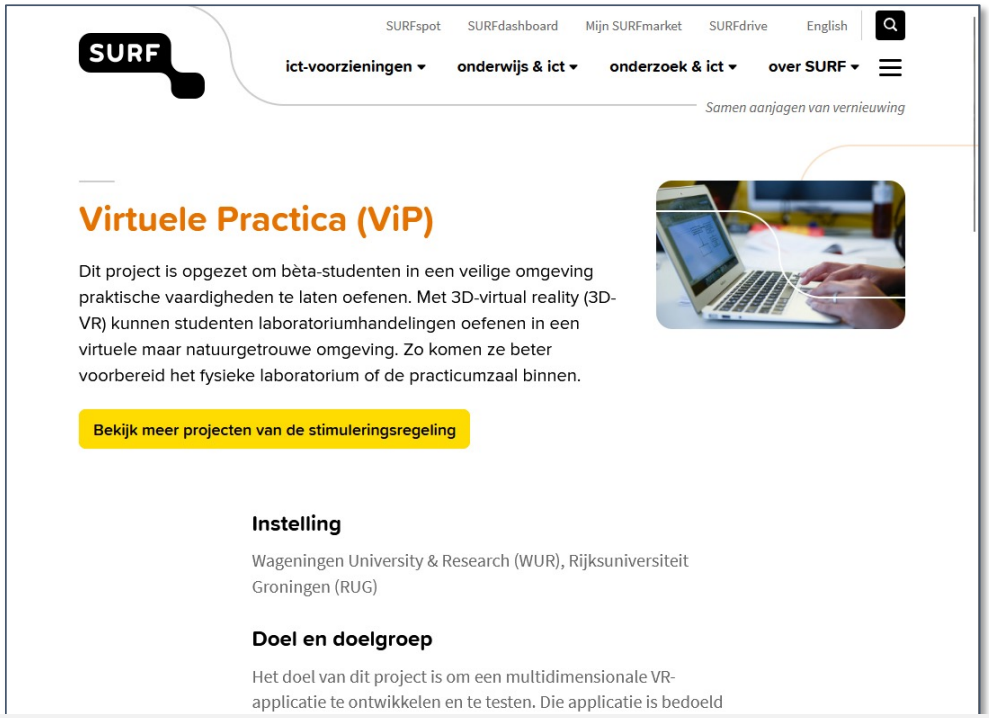
WAGENINGEN UNIVERSITY & RESEARCH

labbuddy®

EPIC Educational Pioneers and Innovators Conference

On the digital transformation in higher education 2022

Follow-up SURF project: Virtual Practicals



Duration

2019-2021

Partners

university of groningen

WAGENINGEN UNIVERSITY & RESEARCH

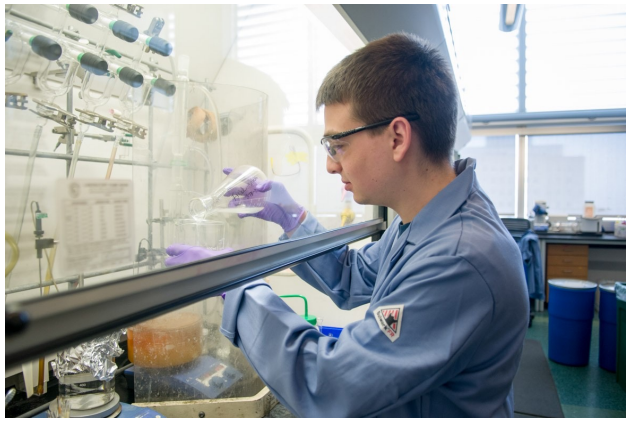
labbuddy®

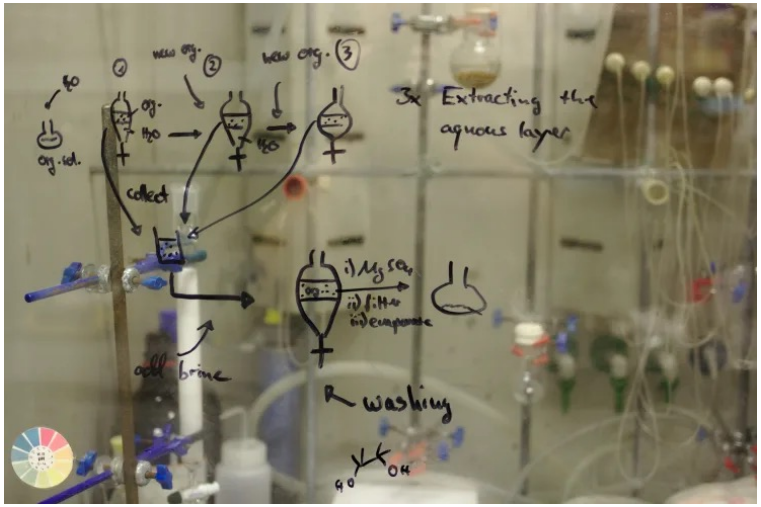
SURF

Ministerie van Onderwijs, Cultuur en Wetenschap

https://www.surf.nl/virtuele-practica-vip

Educational setting





Teachers get many questions

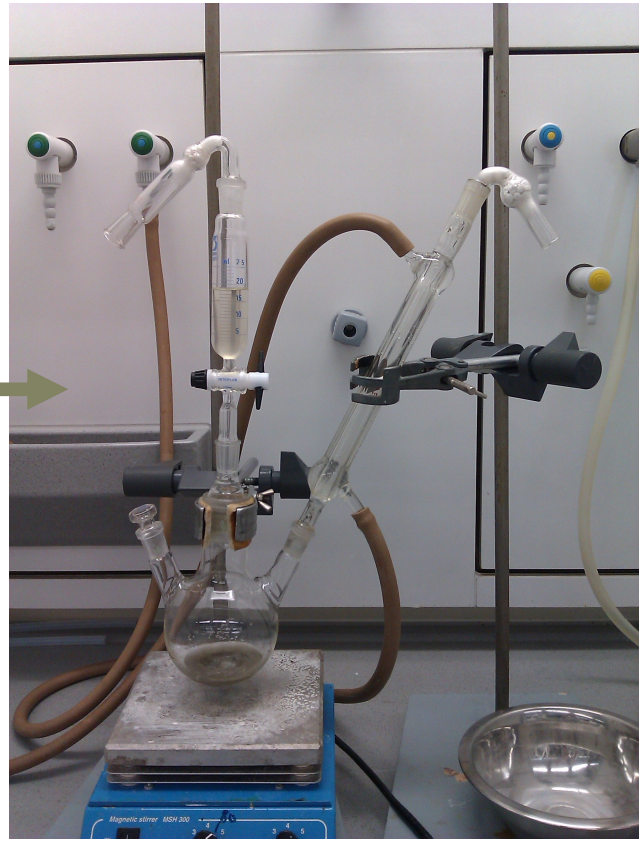
Our question

How can **virtual reality** contribute to the efficient teaching of **practical skills** in an **organic chemistry laboratory**?

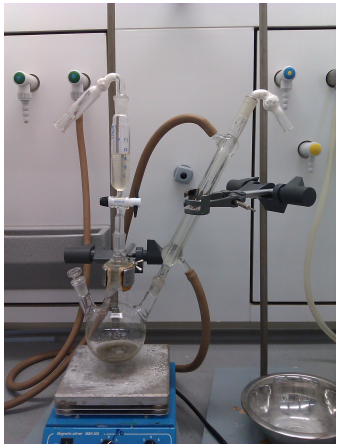
Big challenge:
Lower laboratory anxiety

ViP in reality

Grignard experiment in fumehood



Professor creating experimental setup in VR

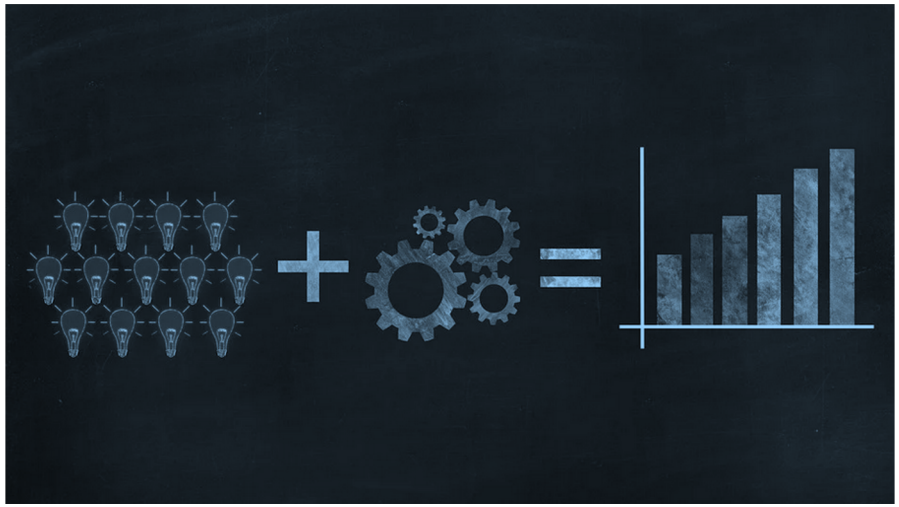


Original questions/approach

1. Develop the app

2. Measure didactical impact
   - Students
   - Lecturers/Assistants

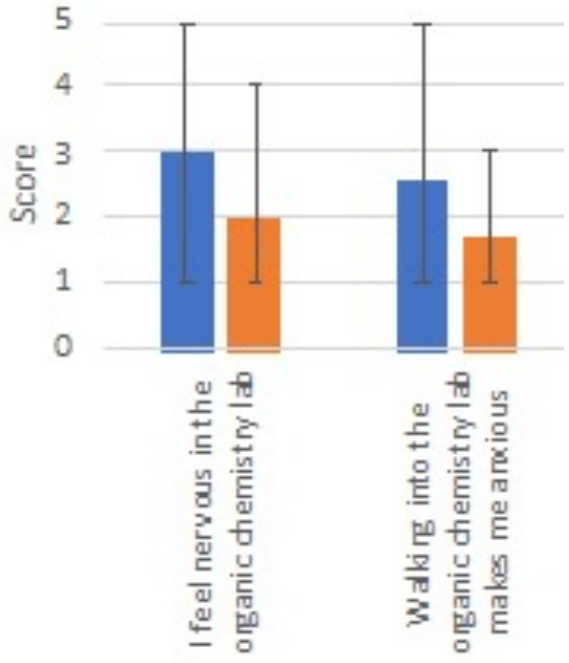
3. Measure managerial impact
   - Costs
   - Efficiency



Main findings of the didcatial evaluation*

1. Students and lectures appreciated the VR app

2. Anxiety seems to be signficicantly lower after using the app.



*) Gungor et al, EURASIA J Math Sci and Tech Ed 2022, 18(3):em2090

Main findings of the managerial evaluation

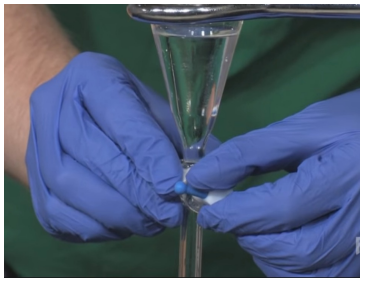
- Customization options in app is a must, as each lecturer wants something different.
- High development costs (175k€).
- VR technology is still in rapid development.

Our take on a VR ecosystem for organic chemistry education (1/3)

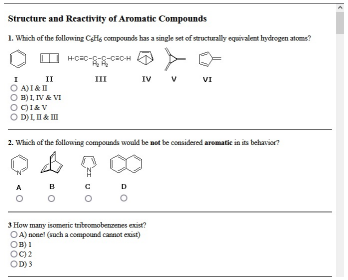
Device with web browser

Web server with library

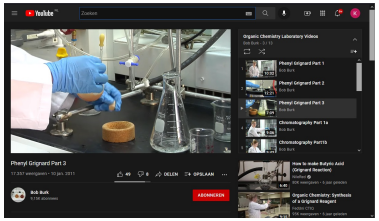
VR app



'Micro-interaction' simulations



Supporting materials / theory



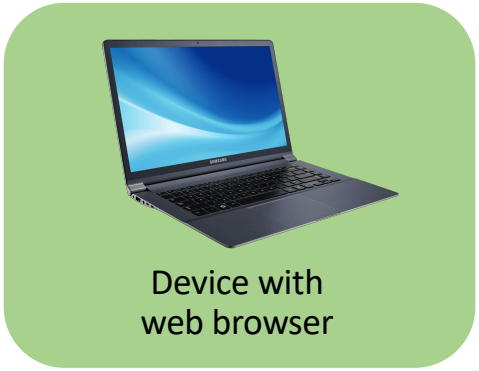
Videos of experiments

'Toolbox' with glassware

Our take on a VR ecosystem for organic chemistry education (2/3)

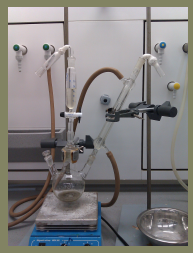
Teachers

How students could prepare for their laboratory experiment



Device with web browser

VR app



Laboratory

Students

Prepare theoretically

Create experimental setup using toolbox

Practice micro-interactions

Watch experiments

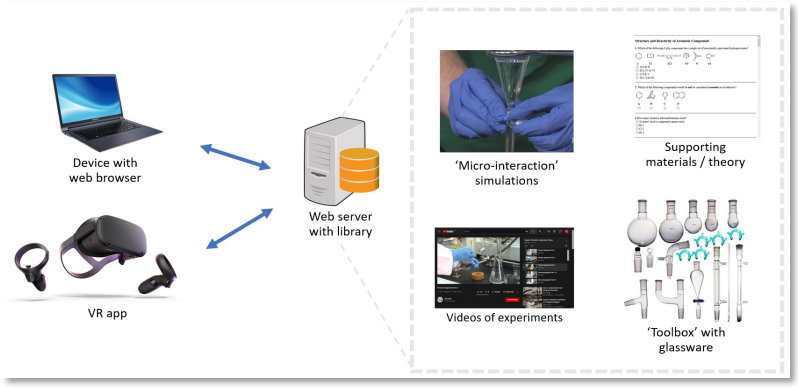
Answer questions about the experiment

Perform experiment

Closing thoughts

1) We have a working prototype

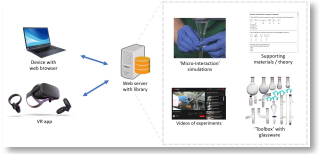
technically educationally



2) We have a vision for the future

Closing thoughts

Prototype



Vision

- Stay up-to-date
- Management efficiency vs learning goals
- Licences/privacy (Facebook)
- Communication between IT, chemists & managers
- Costs high
- …..

- **How to make this sustainable**?

Virtual reality in Practica

Prof.dr. Harry Bitter (WUR), **Dr. Koos van der Kolk** (Labbuddy)

WAGENINGEN UNIVERSITY & RESEARCH

labbuddy®

Virtually Real 2021, 12-11-2021