INVENTORY ALTERNATIVES FOR PRACTICAL EDUCATION

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY · WAGENINGEN UNIVERSITY & RESEARCH · Universiteit Utrecht · UMC Utrecht

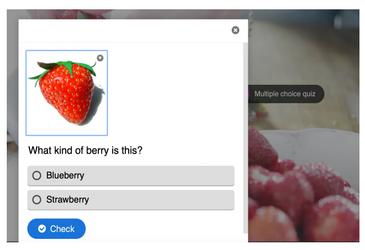
WAGENINGEN UNIVERSITY & RESEARCH

H5P

An open-source content collaboration plugin compatible with several education management softwares. The tool provides a wide range of content types suited for various needs, particularly in practical education and field trips.

Functionalities

- Create rich interactive videos allowing users to add questions and pop-up texts. VR 360° videos are also another popular feature used for preparing virtual excursions.
- Provides branching scenarios and other types of self-paced learning scenarios.

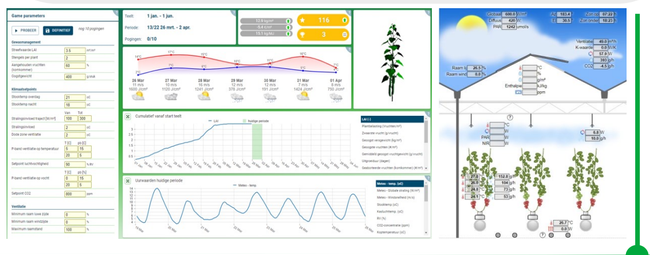


Kassim

An online simulation game that provides emulation into the climate control processes found in greenhouses. Purposefully, built with the most up-to-date info in all recent developments concerning climate control strategy and greenhouse technology

Functionalities

• Allows students to compete with one another for the highest score based on the class theory.
•Players receive feedback for their actions while playing the game.



Virtual Practicals

This pilot project allows students to practice lab practical skills in a safe environment using 3D virtual reality. Participating students will find themselves better prepared for real lab practical's.

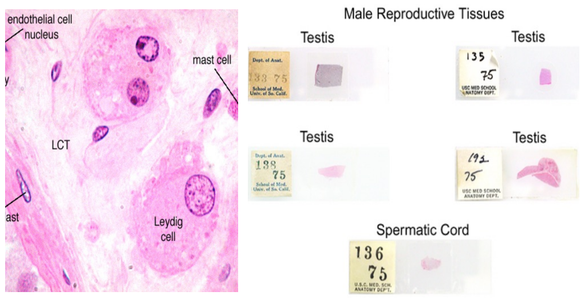
- An evaluation of the operational viability of (3D-)VR in practical education will be conducted as well as its scientific/educational and didactic functionality in education.

Virtual Microscope

Recreates the look and feel of a microscope in an intuitive, browser-based interface that allows the user to explore pre-captured histology image data. The different tissues provide context, labels and text descriptions providing opportunities for independent study. It is used since 2010 by the Human and animal Physiology chair group for more than 800 students per year.

Case studies

- Each slide has a number which enables class discussions and assignments.
- Prepares students for real-life practicals.

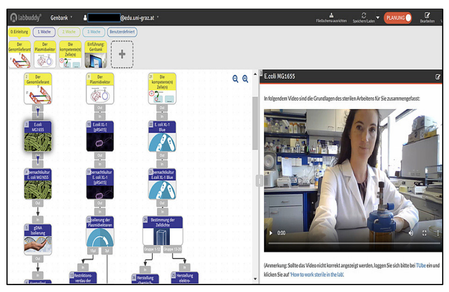


LabBuddy

An e-learning tool that supplements traditional lab practical education by helping prepare students before lab work, supporting them while working at the lab, as well as guide them during the experiment.

Functionalities

- Flow scheme of the experiment
- Enriched Lab manual with photos, videos and interactive questions.
- Booking of tools and lab equipment.

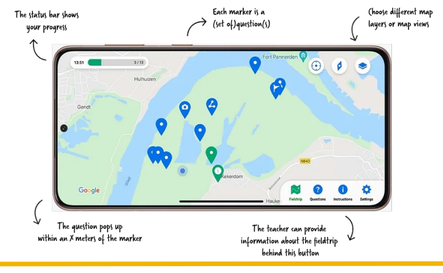


PEEK App

An innovative app that helps teachers organize effective excursion trips for large number of students. The app enhances and stimulates the engagement of participants, as well as giving teachers the chance to set up all-digital field trips.

Functionalities

- Guides students to independently find their way through all excursion points.
- Eliminates the need to print out materials with teachers having extra time in their hands
- Prompts students to pose questions and discuss answers within the group

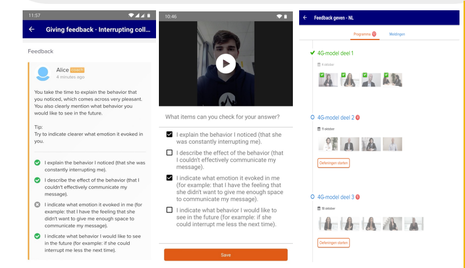


Traintool

A tool that allows students to actively train and test their communications skills through video role plays in an online learning environment accessible from both a laptop or a smartphone.

Functionalities

- Record speech and videos and receive feedback from teachers other students.
- Provides practice for real life situations (Interviews, bad news conversations, networking)
- Provides theory for improving different soft skills



VPIphotonics

Practising with real optical components and photonic systems is prohibitively expensive for students and not always possible. VPI photonics is a professional software program that allows the designing of optical communication systems, as well as the emulation of photonic components.

Use Cases

- Complements lectures and practical's both in the class or remotely online.
- Carrying out dedicated assignments or exploited for research purposes

Remote Labs

A web-based software system that allows students to carry out engineering experiments by remotely controlling real physical test setups from the University labs. Students can change parameters, measure signals and view the whole setup live via a camera feed while operating it. This provides many advantages over traditional simulation models, making the experience more engaging and tangible for the student.

Functionalities

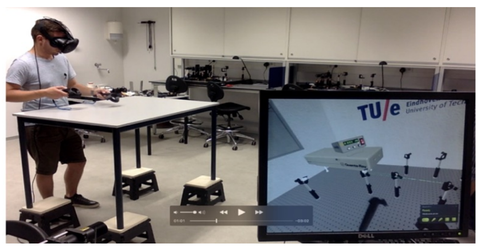
- Contains a planning tool for booking different timeslots for using the equipment
- Interactive pedagogic system that guides the student through the experiment process.

Virtual Reality Labs

A virtual reality environment where the student dives into a three-dimensional world representing real-life practical scenarios. The student can go through experiences, apply deep knowledge in hands-on practical assignments and analyse data that otherwise could not have been possible due to risks for health, high costs in equipment and implantation or lack of time.

Use Cases

- VR was recently introduced as a pilot for the course Optical diagnostics. The program created a virtual reality lab for students to practice the otherwise dangerous tasks related to working with laser equipment. VR practicals allowed students to practice on emission spectroscopy, absorption spectroscopy, laser-induced fluorescence and Thomson scattering.



TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

COMSOL

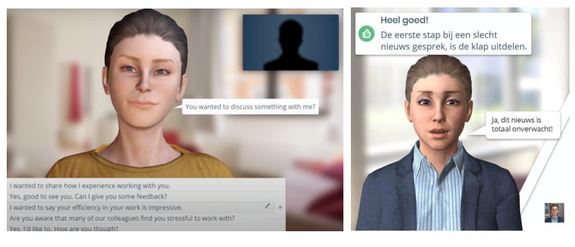
COMSOL is a software program that enables engineers, scientists, and researchers to simulate and analyse complex physical systems using Multiphysics modelling. It allows users to create virtual prototypes of devices, processes, and systems, and test their performance under a wide range of conditions.

Dialogue Trainer

Dialogue Trainer is an online simulator where students can practice their conversation skills with a virtual character. This character reacts with both text and emotion based on the dialogue choices the user makes. An example of this can be a bad news conversation in a medical or veterinary consultation.

Functionalities

- The user gets a score based on his dialogue choices
- Students can also receive feedback from the lecturer

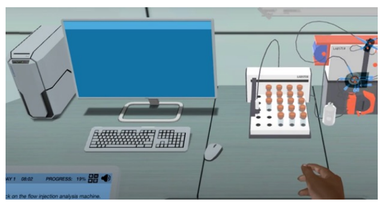


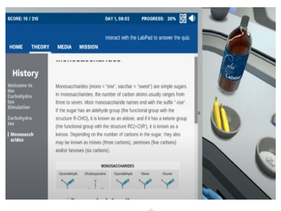
Labster

An online tool that provides a large collection of virtual laboratory simulations. This program creates a virtual and interactive lab simulation where students can conduct experiments showing them what would happen in real life while also underlying the theory behind each procedure.

Use cases

- Creates a safe environment for students where it doesn't matter if they make a mistake. This prepares them for real-life experiments.
- 200 different labs to choose from.





Acoustic Virtual Reality

Sound and acoustics are a vital aspect of numerous engineering applications. However, unlike other fields which rely primarily on visual tools, acoustics are mostly taught to students in a purely conceptual way.
AVR provides both visual and acoustic VR in 3D for evaluating noise and sound in both indoor and outdoor spaces for educational purposes. Moreover, it will also serve as a learning tool for better understanding the meaning of sound in spaces and the consequences of material choice and room geometries.

PleitVrij

A virtual environment that gives students the possibility to practice and argument in a virtual courtroom. This allows the student to look around in the Oculus Rift S-glasses where on one side you see the judges and on the other side the audience. This gives the participant an unparalleled experience which is very close to reality.

Functionalities

- Other students (audience) can watch the pleader on a big screen and provide feedback.
- Possibility to rewatch the audience to contribute to an optimal learning experience.

PathXL

A software that makes it possible to examine microscopic slides online. The student can zoom, rotate, change depth, take measurements and even see slides in different colours. The tool also offers and e-learning tool where the viewer is guided through a microscopic preparation and is asked carefully directed questions to provide insights about some of the observations.

Use cases

- Facilitates teaching and explanation
-Prepares students for practical's making their time at the lab much more efficient.

Hololearn

An interactive virtual reality game environment, where students can practice movement centred care with virtual patients. The objective of the game in trying to achieve the best possible exercises and energy score for the patient based on the different patient health records and unique personalities.

Use cases

- A total of 7 scenarios have been developed.
- Allows nurse and physiotherapy students to practice these key skills.