

An immersive Twin of a Chemistry Laboratory

The National Conservatory of Arts and Crafts (Le Conservatoire national de arts et métiers – Le Cnam) designs, develops and experiments with virtual reality (VR) chemistry lab exercises: an immersive twin of a real laboratory. In a virtual environment, scripted and interactive, the professional hand gestures of Chemistry are acquired in complete safety. This twin, Geste'VR, is an educational simulator, a training tool for the chemical, pharmaceutical and agri-food industries. The Cnam's National Department of Digital Uses has designed these practical work session modules in VR in close collaboration with 15 teachers from 3 national teaching teams

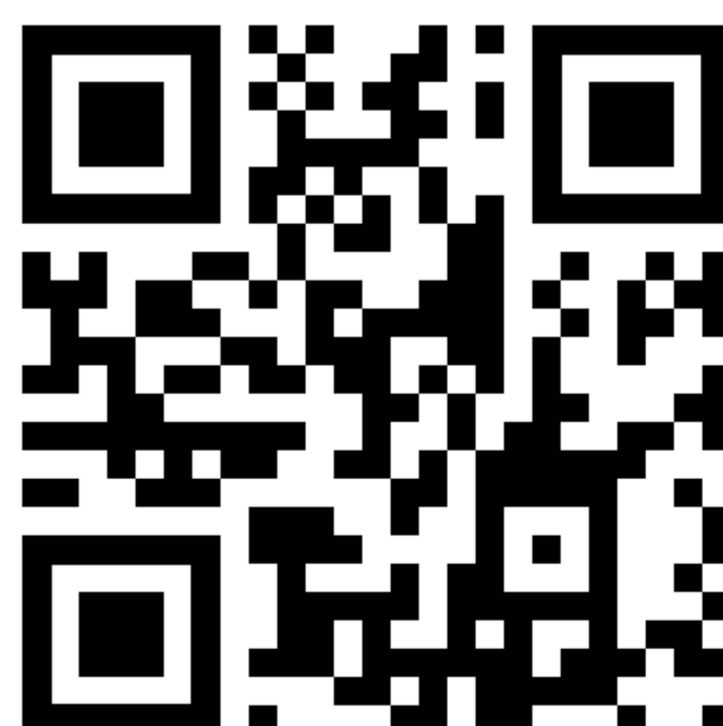


The progress of the learner is guided through stages that are successively:

- identification of the environment and its components,
- characterization of the equipment and in particular the dangers, its address,
- associated safety procedures.

Then the pedagogical scenario confronts the learner with a series of frequent hazards in the laboratory. Having validated the first steps, the learner will be in a situation to mobilize his skills to counter them. Then he will learn the essential professional hand gestures; to organize his workspace; to carry out simple experimentations (extraction, dosing, solution preparation, pH reading, distillation, etc.), all in compliance with safety standards.

We have worked on the pedagogical efficiency of the simulator by paying particular attention to the way in which the learner identifies at any time, thanks to visual guides, the learning objectives targeted, he is thus directed in real time and makes his choices in complete autonomy. All actions are recorded and traced in the form of learning variables and our simulator offers regular feedback that anchors the knowledge.



An innovative Teaching Device: an Augmented Virtuality



In addition to the acquisition of technical skills, Geste'VR also addresses relational skills. Indeed, an Augmented Virtuality Device on a green background offers an intense and unprecedented collective work experience in class: the student who acts in VR is seen in context in the virtual laboratory, on a large screen, by the whole class group. On the return Screen, the subjective view of the learner in action is also represented.

The class and the teacher interact directly with the learner and guide him, creating a mentoring effect. Geste'VR, in this still experimental prefiguration, is an innovative and new Device in Higher Education.



#ELI2022

Direction nationale des usages du numérique DN1 et équipe pédagogique
 Koscielniak T., Cousquer C., Dewez S., Sylla Iyarreta Veitia M.

Pomet M., Miquelard Garnier G., Corsyn N., Lagarde N., Khaoulani S., Horellou T., Havet J-L.,
 Haustant C., Hauquier F., Gomez C., Gervais M., Garcia R., Chapet C., Caqueret V., Amara Z.
 Contact : dn1@lecnam.net

EDUCAUSE