

Online Interactive Chemistry Labs



CHALLENGE

Chemistry is a field in which researchers and students alike explore and test their understanding through experimentation. Unfortunately, “learning by doing” in the traditional sense presents the following limitations to instructors and learners:

On-Campus Learners	Online Learners
<ul style="list-style-type: none">● Limited Time to Complete Labs● Little Experimental Freedom● Safety Concerns● High Costs of Delivering Labs	<ul style="list-style-type: none">● Unrealistic Simulations● Poor Functionality & Interactivity● Few Institutions With Online Labs● Content Not Vetted by Faculty

SOLUTION

Oregon State University (OSU) and Smart Sparrow are working together to **revolutionize the way chemistry is taught and learned**. We are creating “**Lab Builder**”, a tool **instructors can use to build custom virtual lab environments**, as well as **27 fully-online chemistry labs with realistic, interactive simulations and lab manuals**. These labs will greatly scale access to high-quality laboratory experiences to meet the needs of a more diversified range of students.

Our Online Chemistry Labs utilize visually-stunning simulations and support blended and fully-online chemistry courses. The Lab Builder tool will enable instructors to easily customize experiment scenarios using different lab apparatus and chemicals to meet different learning goals, then deploy them to students via Smart Sparrow’s platform or their LMS. Both Lab Builder and the online labs will be available to all OSU faculty, and later to other institutions.

LEARNING IMPACT OUTCOMES

The Lab Builder and Online Chemistry Labs will support students’ **development of key competencies**, and allow them to practice critical skills in a zero-risk environment. On-ground learners can use these labs to prepare for in-person experimentation, while online students gain access to previously-impossible lab experiences. More students get the chance to learn and fully explore chemistry in a project-based environment, inspiring self-guided learning.

RETURN ON INVESTMENT

Lab Builder and OSU's Online Interactive Chemistry Labs will be the **most immersive and realistic faculty-authored simulation of chemistry labs created to date**. Moreover, we are using technology to make the labs **personalized and engaging** with adaptive feedback at every step—a feat which large lab sections simply cannot achieve. These labs will **reach students who are currently cut off from the many professional and metacognitive benefits of lab science courses** due to distance, time, economics, or a combination of these factors. Eventually, these labs may be licensed for use at institutions beyond OSU, increasing their impact even more and providing a sustainable base to continue further development plans.