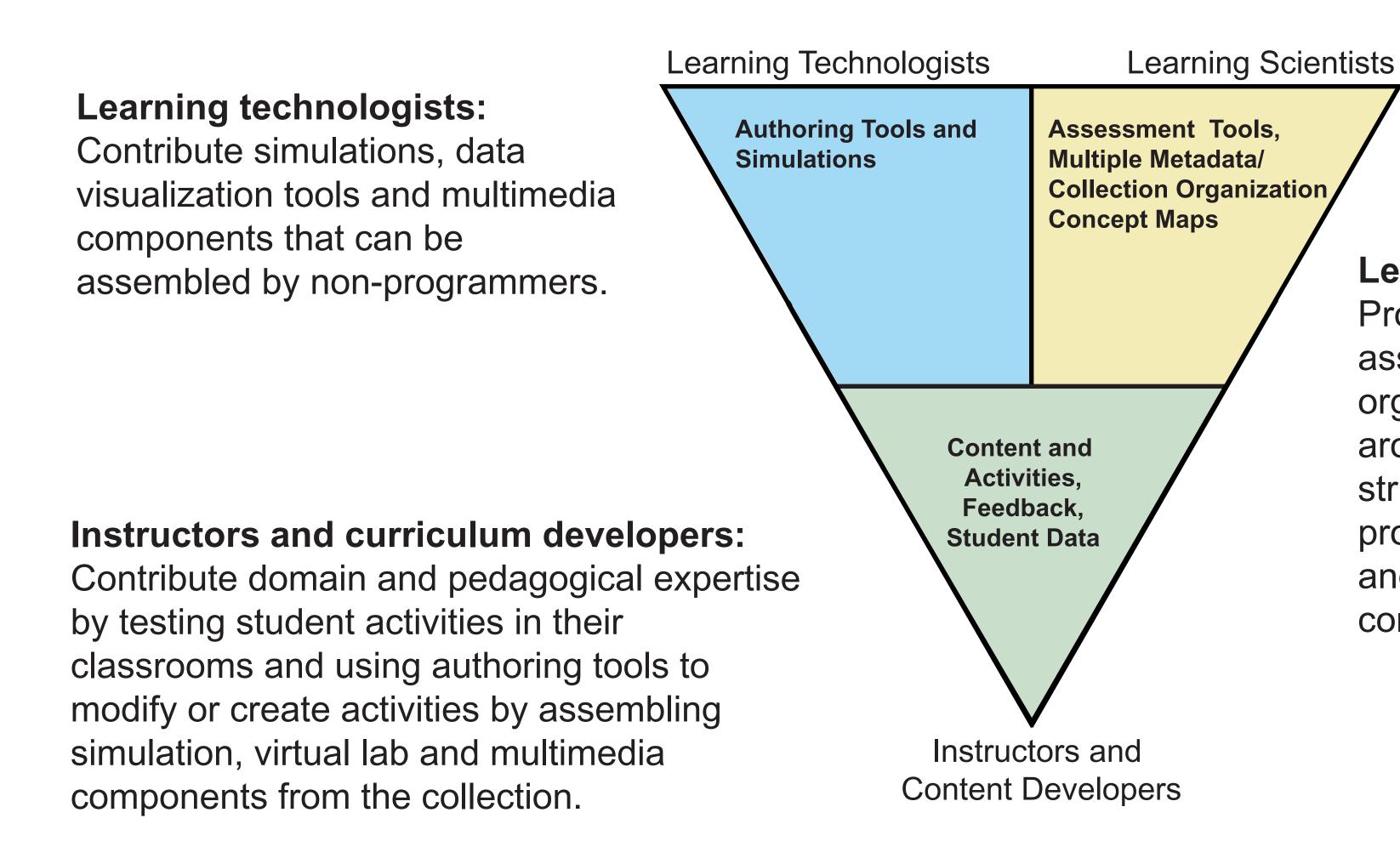


David Yaron, Rea Freeland, D. Jeff Milton, Michael Karabinos, Donovan Lange, Jordi Cuadros, Emma Rehm, Tim Palucka Department of Chemistry, Carnegie Mellon University, Pittsburgh, Pa

Goal: Build a DL Community to improve conceptual understanding in chemistry using simulations and scenario-based learning.

Effective online curriculum development typically requires a team of learning scientists, learning technologists and domain experts working in close proximity (tight coupling). Our goal is to us DL structures to support remote, asynchronous collaboration within a community that, together, possesses the necessary three types of expertise (loose coupling).

Digital Library Supporting Architecture:



Community Building and Support:

Booths and Workshops at Professional Society Meetings

Booths provide an efficient means to recruit teachers and other community members, and to get rapid feedback on the degree to which the collection meets their needs. Workshops provide hands-on support to current and potential community members.

Findings and Lessons:

Local/Regional meetings have been more effective at reaching our target audience than national meetings.

Demand is such that we are shifting our emphasis to include the needs of the community collges audience.

Website

As the community grows, recruitment and support will move increasingly to the website via online guides and peer interactions.

Current Community:

Userbase: 20 High Schools and Universities with over 3,500 annual student users **Collaborating authors:** 6 instructors contributing over 30 activities

Using Digital Libraries to Build Educational Communities: The Chemistry Collective

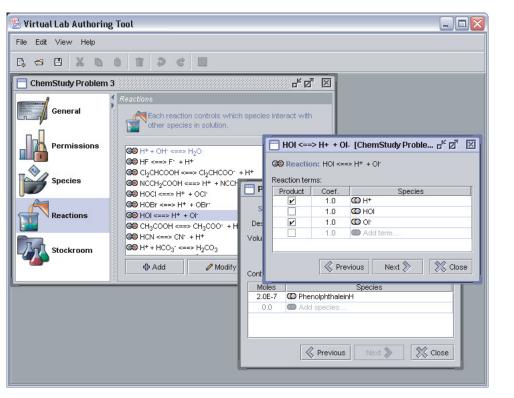
Interactive Content

These technologies help the community meet what we have identified as the two main learning challenges in chemistry instruction:

- chemistry (Virtual Lab)

Virtual Lab

This is a flexible networked chemical laboratory simulation that allows students to select from hundreds of standard chemical reagents and combine them in any way they see fit — providing them with an opportunity to interact with chemical systems in a manner that would not be possible with paper-and-pencil activities. This includes allowing them to design and carry out their own experiments.



Virtual Laboratory Problem Authoring Tool

Scenario Collections

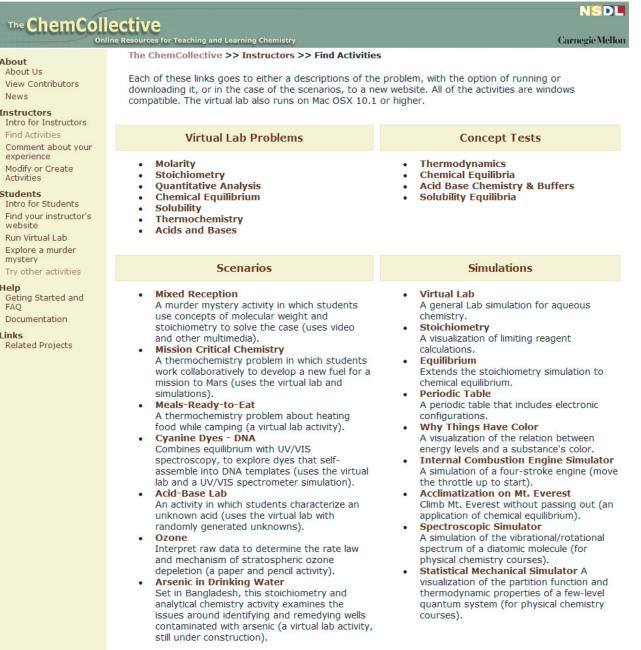
Modifiable collection of scenario-based learning activities that embed the procedural and conceptual knowledge of the course in contexts that highlight the utility of that knowledge. Some examples are shown below.



- 3. Ozone Scenario on Kinetics

Learning Scientists:

Provide pedagogical and assessment guidance by organizing the collection around a conceptual structure of the domain, providing assessment tools, and participating in community discussions.



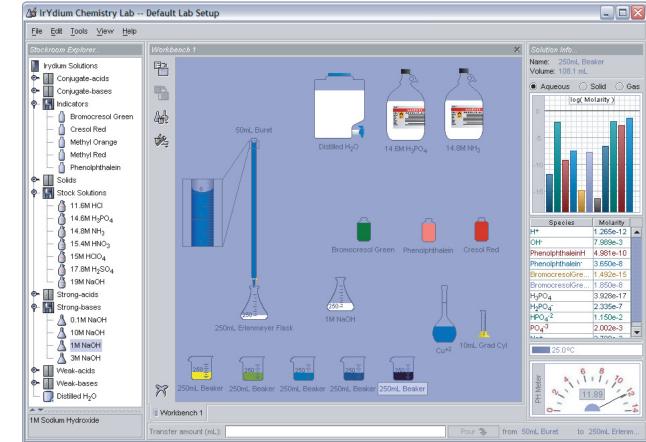
The ChemCollective website



Gaea Leinhardt, Karen Evans, Javier Corredor Learning Research Development Center, University Of Pittsburgh, Pittsburgh, Pa

• Helping students connect the notational and algebraic procedures of the course to authentic

• Helping students see the utility of chemistry in the world around them (Scenario Collections)



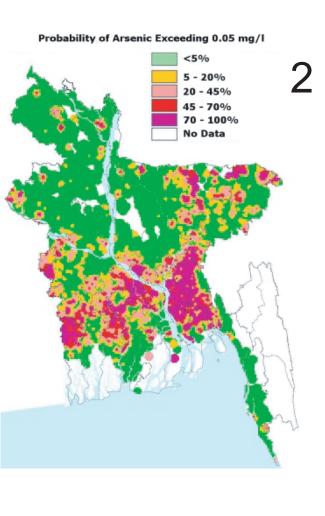
Virtual Laboratory Simulation

Problem Authoring Tool

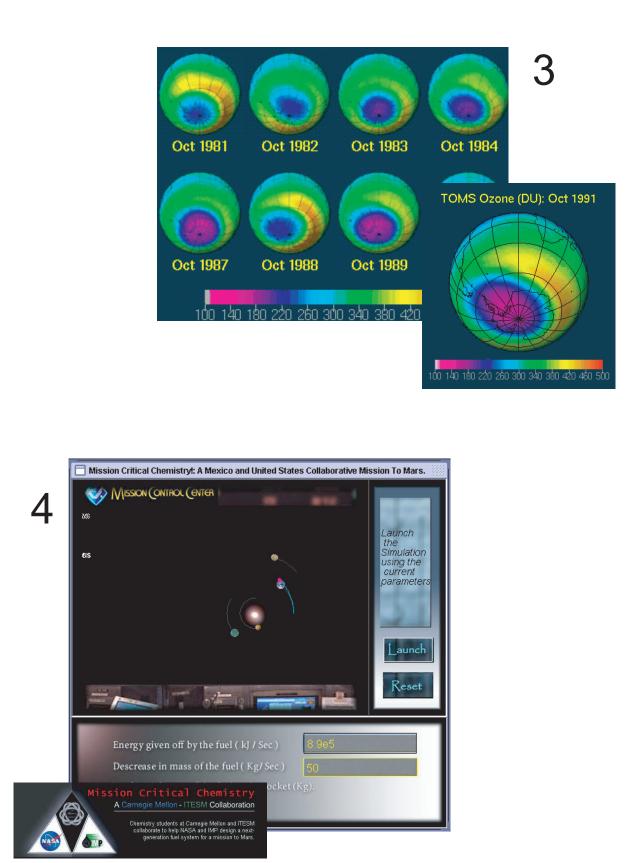
Allows curriculum developers to create activities for the virtual lab by:

- selecting or creating chemical solutions for the stockroom
- adding new chemical species such as proteins and drugs
- configuring the interface to make specific laboratory equipment available
- providing HTML problem descriptions
- depositing assignments in the DL collection





. Mixed Reception Murder Mystery Scenario 2. Groundwater Contamination by Arsenic in Bangladesh . Mission to Mars Thermochemistry Activity







Benefits

Local benefits

· Targets a particular, domain-specific, educational challenge and intervention strategy, that of promoting qualitative learning in introductory college and high school chemistry courses.

· Takes full advantage of the power of **digital content** to address educational challenges, through a combination of simulations and multimedia.

· Takes advantage of the ability to organize content in **multiple ways** as a means to promote and organize educational change.

· Allows for **iterative improvement** of the content based on classroom experiences and measured learning outcomes.

Benefits to NSDL as a whole

 The creation and demonstration of a digital library **architecture** that supports community authorship, modification and maintenance of interactive content.

A portfolio of experiences and assessment studies on

Research Questions

We are monitoring the community building process to create a portfolio of assessment studies that address the following questions:

What are the principal benefits and barriers that influence potential community members decisions to participate in the collection?

Which Digital Library structures are most effective at supporting a community of users and authors working together to address specific educational challenges?