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Indie
## Building Realistic Problem-based Online Learning Environments

Overview

Problem-based learning centers learning activities around the investigation and development of solutions to complex realistic problems. However, working on realistic problems can be expensive and even dangerous for students, and supporting such projects is very labor-intensive for the faculty. Computer-based interactive learning environments provide responsive and safe settings for doing realistic problem-based learning activities, but such systems are expensive and complicated to build or customize. To address these problems, we have built Indie, a content-independent tool for authoring and delivering web-based investigative challenges.

System

Indie includes a run-time engine and an authoring tool. The run-time engine creates an authentic learning environment where students can run simulated experiments, analyze test results, form rationales, and construct arguments to support or refute possible hypotheses. Students' working progress is recorded in the system and made accessible to the mentors for critiquing. Mentors can provide critical coaching to the students to complement the feedback generation from the system. Corrosion Investigator is an example of the Indie learning environment on biofilms in which environmental engineering students take the role of consultants helping a paper processing company find the cause and cure for recurring pipe corrosion problems.
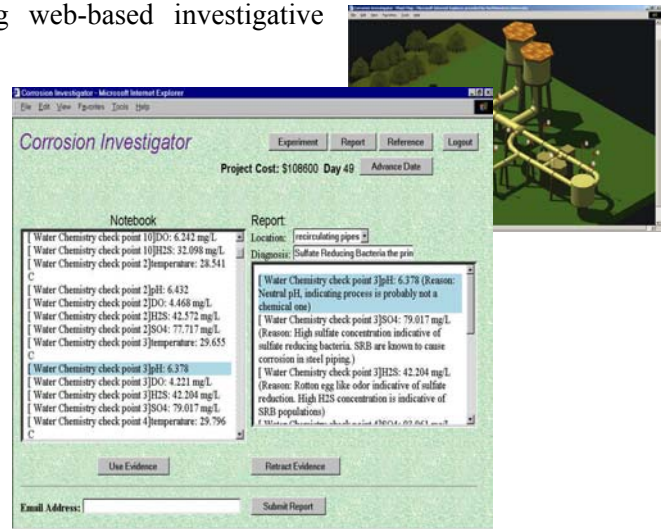
Indie's authoring tool provides a form-based web interface that allows experts to describe the content of an investigative challenge, the tests students can run, and so on, with no programming. In addition, mentors can introduce new materials into the system as needed at runtime.
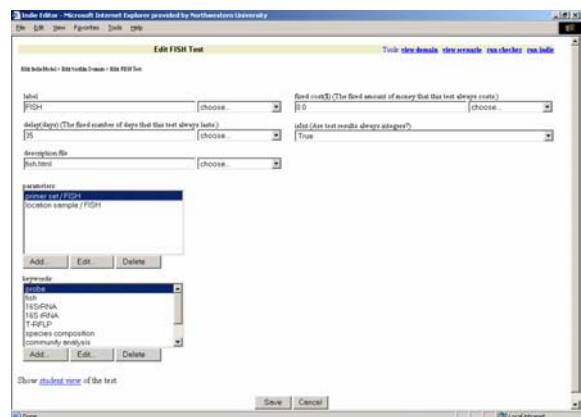
Scope

Indie can create learning environments for different domains where diagnostic evidence-based reasoning is appropriate. The flexibility of Indie facilitates the process of bringing problem-based learning activities into the curriculum, which will result in more effective teaching and learning.

For more information, view: www.cs.northwestern.edu/~qiu/indie