I2U2 Requirements 2008 - 2012

Project Goal: To address these research questions:
Do students learn science practices through e-Lab—grid-enabled virtual investigations?
Specifically, do they increase their skills in using technology as a tool for conducting science (skills that mirror real-world science)?
Do they engage in scientific collaboration and increase their knowledge of related science and grid concepts?

Does the Interactions in Understanding the Universe virtual learning community support teacher practices and development to enable students to learn science practices with the I2U2 cyber-enabled tools?

Introduction: The current I2U2 NSF grant (written for the DR-K12 program: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=500047) has a tight research focus on testing three e-Labs and the i-Lab. Given the NSF direction on rigorous research, providing data per the evaluation plan is vital to the success of the grant and the future of e-Labs as a model for teaching and learning science using cyber technology. Everyone in the collaboration must be involved.

Deliverables: 4 production e/i-Labs including virtual learning community tools and evaluation tools, data and reports.

Time Line: COSMIC AND LIGO PRODUCTION e-LABS MUST HAVE COMPLETED PRODUCT DEVELOPMENT EVALUATION (see below) BY JUNE 1, 2009 AND CMS AND THE COSMIC i-LAB BY JUNE 1, 2010. This includes tools for the virtual learning community and pre- post-tests.

Year 1 Test
Prior to Summer 2009 – Complete product development phase (see below) for Cosmic and LIGO.
Summer 2009 – Cosmic and LIGO professional development workshops for 10 teachers each
Academic year 2009-2010 – Classroom implementation phase including community building & support
September 30 – Year 1 evaluation report

Year 2 Test
Prior to Summer 2010 – Complete product development phase (see below) for CMS and Cosmic i-Lab
Summer 2010 – Cosmic, LIGO and CMS professional development workshops as for 10 teachers each
Academic year 2010-2011 – Classroom implementation phase including community building & support
June 1 – May 30 – Cosmic i-Lab implementation at Adler
September 30 – Year 1 evaluation report

<u>Year 3 Test</u>
Summer 2011 – Cosmic, LIGO and CMS professional development workshops for 10 teachers each
Academic year 2011-2012 – Classroom implementation phase including community building & suppor.
June 1 – May 30 – Cosmic i-Lab implementation at Adler
September 30 – Year 1 evaluation report

Evaluation Plan Components:

<u>Product Development Phase for e/i-Labs</u>
Think aloud
Expert review
Beta Test
    Small scale beta test
    Production scale beta test

In addition, the e-Lab specific pre- post-tests must be validated through use by some 100 students.

<u>Implementation Phase (Ongoing Assessment for e-Labs)</u>
Learner objective achievement
    Pre- post-tests
    Posters/rubrics
    Personal logs

Workshops and follow up support for teachers
    Surveys & phone interviews
    Help desk reports

Online community
    Review on comments & phone interviews

e-Lab Portfolio Requirement

Introduction: I2U2 creates a portfolio or library of science problems, topics and datasets that bring frontier science investigation to classrooms and informal settings. To be included in the portfolio, e-Labs—grid-enabled virtual investigations—must meet specific requirements based on results of needs assessments with educators. Constraints on interface design and administrative tools give teachers the one-stop-shopping they requested. Teaching and administrative tools allow us to track usage and assess student learning. (You could think of the e-Lab portfolio as comparable to the teacher's edition of a textbook where each chapter is a different e-Lab.)

e-Labs must:

Use authentic data for scientific investigations that students design.

Have common components [http://www13.i2u2.org/glossary/index.php/E-Lab_Outline]:

    <u>Project Page</u> – general overview

    <u>Teacher Pages</u> – common required format and information

    <u>Student Pages</u> – common navigation and required sections with open design

Support collaborative learning.

Support common learner outcomes in addition to specific e-Lab content LOs.

Require only a browser for school-based users.

Have capabilities for data access, processing and publishing and for reporting results (and some for data upload).

Have grid-based analysis code and administrative tools based on the SWIFT infrastructure.

Have searchable metadata associated with data and data products (plots, posters).

Use virtual data tools and techniques.

Use common infrastructure for educational scaffolding (milestones, logbook, references).

Support a virtual community of learners with online discussion forums, document storage, wiki-like interactive publishing and help desks.

Offer professional development workshops to help teachers become effective users.