Sharing Models and Research to Build Leadership in Program Improvement

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October 14, 2011
Strengthening Student Success, San Francisco, CA

Presentation Goals

- Show how one model of faculty inquiry relates to research
- Demonstrate how model engages faculty members in supporting each other in implementing innovative instruction in the classroom
- Engage participants in sharing practices for innovating instruction, discussing assessment data, and coaching each other

Presentation Overview

- Research and faculty inquiry process – Louise (10 m)
- Workshops and Web-based community – Judi (15 m)
- The instructor testimonial – Ken (20 m)
- Interactive test drive – Audience (30 m)
- Group reflection – Whole group (15 m)

Research & Faculty Inquiry

- Problem: How to integrate an innovative lesson module
  - What do I replace in my course?
  - How do I dive in to changing instruction? How do I deal with the risk of changing?
  - How to adapt materials for my students?
  - How can an online community support instructors with different levels of experience?

Background

- Work is part of collaboration between Foothill College and DeAnza College and research team, SRI
- Jane Ostrander (college) & Louise Yarnall
- New scenario-based instruction modules
- National Science Foundation (NSF), Advanced Technological Education (ATE)

Research & Faculty Inquiry

- The Innovative Lesson Module:
  - Bioinformatics: Cross between computer science and biotechnology. DNA or protein sequence information in a searchable computer database. Genetics “detective work”
  - Used for public health:
    - Understanding the genetic basis of disease and developing new treatments (e.g., schizophrenia)
    - Predicting what flu vaccine to use next flu season
  - 4 distinct tasks. Each takes takes 2-3 weeks to complete. Ambitious level of student-led work.
  - Designed by bioinformatics professional, former instructor

Research & Faculty Inquiry

- The Faculty:
  - Community college biology instructors from:
    - 11 colleges across the U.S.
    - 10 states
- The Range of Courses:
  - Advanced and intermediate biotechnology courses
  - First-year non-majors biology
- The Contexts:
  - 2 instructors came from one-person departments
  - 7 instructors came from departments with 5-10 instructors
  - 4 instructors came from departments with >20 instructors

Research & Faculty Inquiry

- The Benefits:
  - Instructors benefited from using systematic faculty inquiry process
  - Researchers benefited by testing a model for remote classroom research that focused on:
    - Understanding how faculty adapt a set of innovative instruction modules across a variety of courses and college contexts
    - Understanding where faculty need support from each other
    - Prototyping a set of activities and online supports for faculty

Workshops and Web-based community

Judi Fusco

SRI International

Workshops and Web-based community

Destination PBL Workshop Final

Search this site

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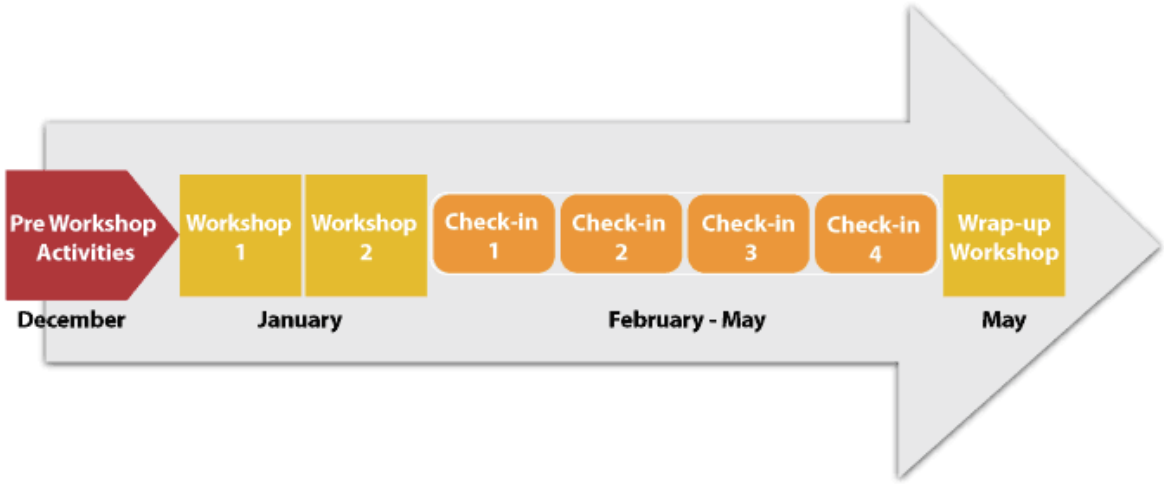
Home

Welcome to the online home of the Destination PBL Bioinformatics Scenario-Based Learning (SBL) workshop. The workshop is part of a larger project, Destination Problem Based Learning (PBL), which supports instructors in learning to use and create PBL tasks in a wide variety of subject areas. You can visit the Destination PBL site for more information. From January - June 2011, instructors will focus on using the SBL Bioinformatics Tasks and reflecting through the Faculty Inquiry Process on how they adopt and adapt these tools in biology and bioinformatics classes.



Workshops and Web-based community

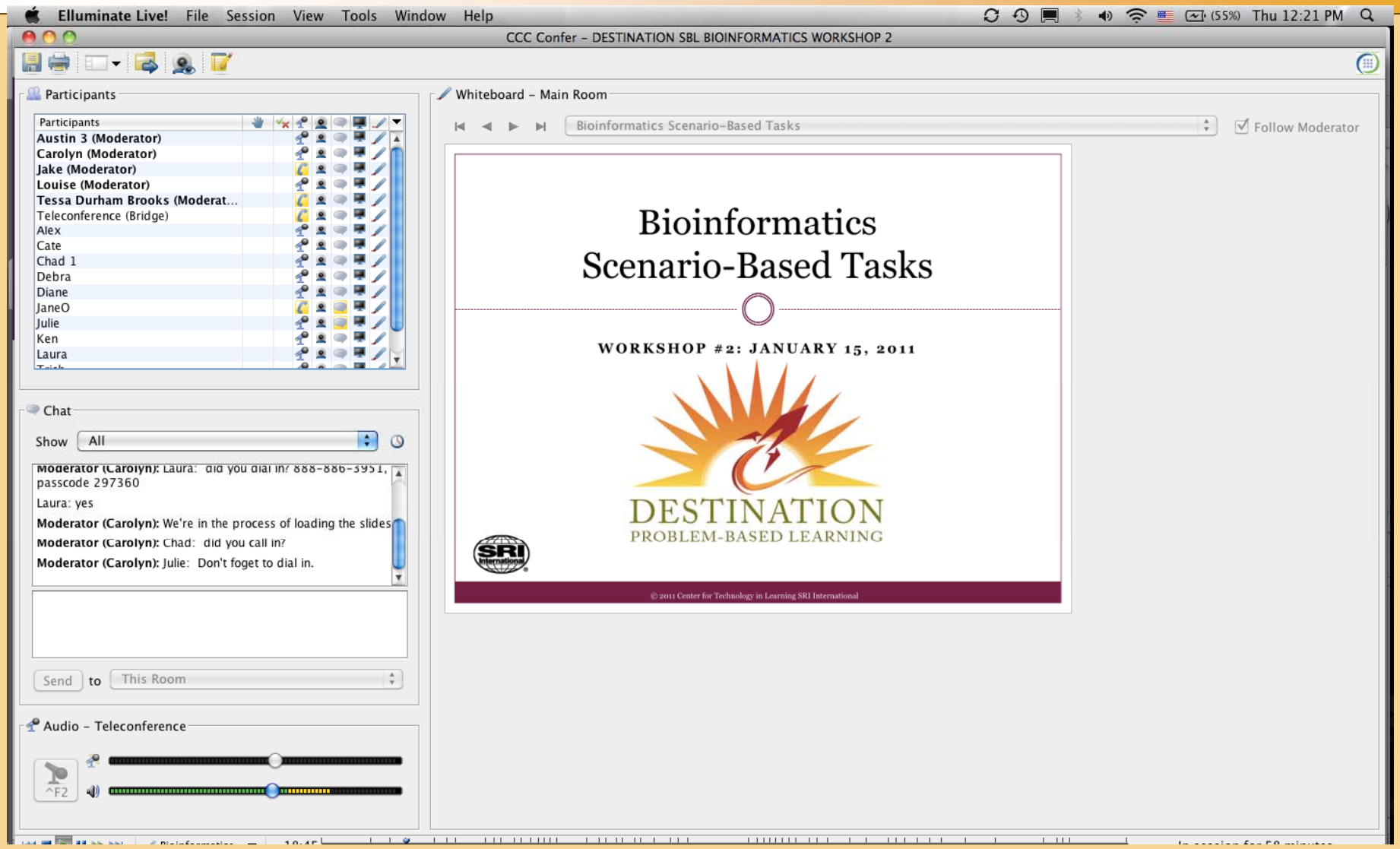
- In the learning experience, 3 themes were continually covered.

Workshops and Web-based community

The materials below will help you understand the what SBL Bioinformatics Tasks are, how to integrate them into your course, and what Faculty Inquiry involves.

Bioinformatics SBL Tasks	
Instructor's Guide	The instructor guide provides more details and background about each of the Bioinformatics Tasks
Bioinformatics Tasks	Before the workshop, you should review them all, and have gone through two carefully.
Sample Syllabi with Bioinformatics SBL Tasks:	
Durham Brooks Syllabus 2008	Molecular Biology 2 syllabus from Dr. Tessa Durham Brooks. This syllabus shows the first time Dr. Durham Brooks included SBL in her course.
Durham Brooks Syllabus 2009	Molecular Biology 2 syllabus from Dr. Tessa Durham Brooks. This syllabus shows the first time Dr. Durham Brooks included SBL in her course.
Jacob Syllabus 2009	General Microbiology Syllabus from Dr. James Jacob. Includes instructor notes in it.
Scenario-Based Learning Principles & Process	
Cognitive Apprentice	A brief discussion of the learning theories behind Scenario-Based Curriculum, situated learning environments, and apprenticeships.
Teaching with SBL	Please make sure to go through the 7 subpages when you click the "Teaching with SBL" link. The information on the 7 subpages can help you as you plan your course. Note: use the Sample Syllabi examples above, since the linked example on the *The Guide for Teaching Problem-Based Learning with Scenarios* is related to Computer Courses.
Scenario Based Learning for your classroom	Here is a scenario to introduce you to some potential issues instructors may face as they begin to teach with SBL.
Faculty Inquiry Principles & Process	
Promise of Faculty Inquiry	An 8-page overview of the Faculty Inquiry research method.
Guidelines for Faculty Inquiry	A more in-depth discussion of the method.
Faculty Inquiry Toolkit	The Carnegie Foundation's website for learning more about Faculty Inquiry.

Workshops and Web-based community



Workshops and Web-based community

Online Workshop #1: January 8

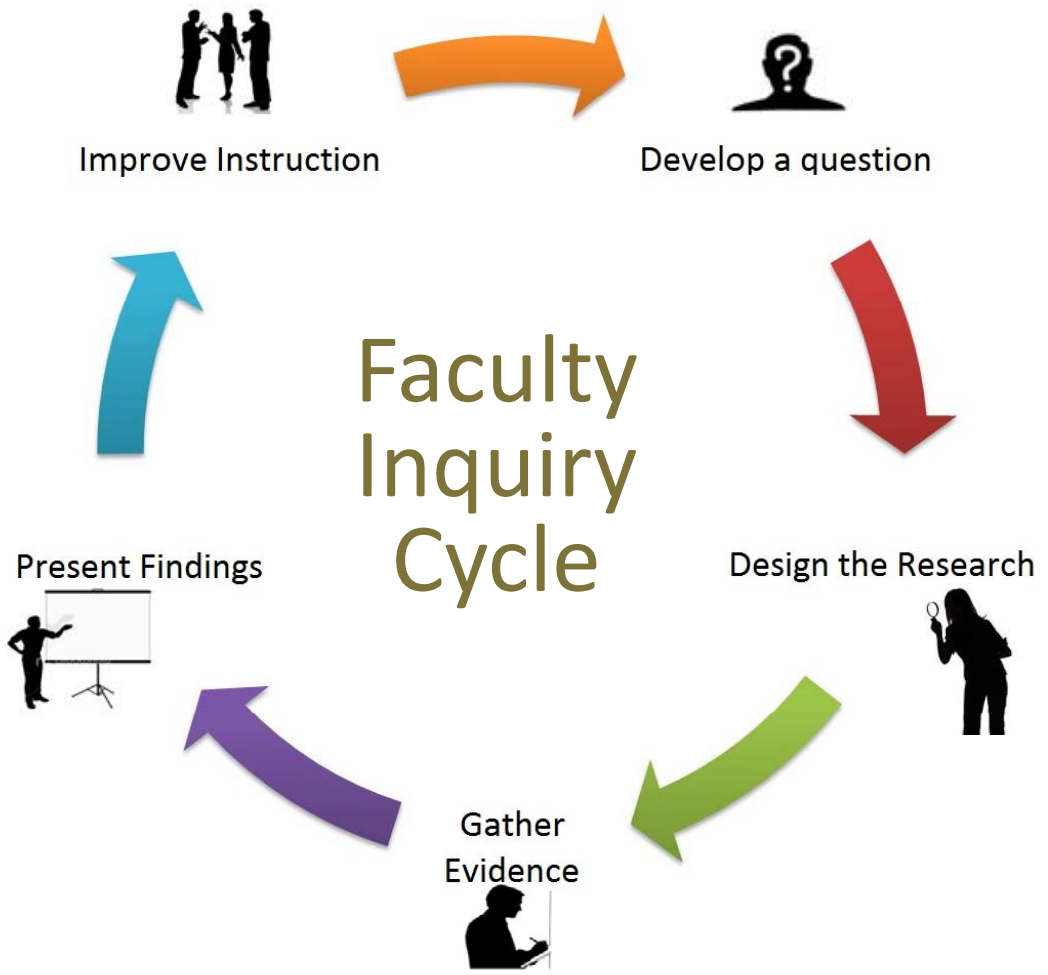
Homework

- **Discussion Board**
  - **Syllabus**
  - **Research Questions**

Online Workshop #2: January 15

What was different in teaching?

Faculty Inquiry Cycle



"A form of professional development by which teachers identify & investigate questions about students' learning."

Faculty Inquiry Research Questions

- Questions about how BIP tasks match the needs of your students
- Questions about how to teach with the BIP tasks and assess student learning

Workshops and Web-based community

Monthly Check-in calls:

- Researchers called Faculty Partners*
- Discussed:
  - SBL Method (SBL theme)
  - Tasks (Bioinformatics theme)
  - Research Question (Faculty Inquiry theme)
  - Plus Partner Process*

Workshops and Web-based community

Faculty Partners/Groups:

- Partners were preferred because it's easier to coordinate 2 schedules than 3
- Assigned--mostly based on geography
- 2 sets of partners involved faculty at the same community college.

Workshops and Web-based community

May 2011, Final Workshop:

- Faculty presented a snapshot of their experience.
- The presentation allowed them to reflect and allows the researchers to get more data on the process.

Faculty engagement in Experience

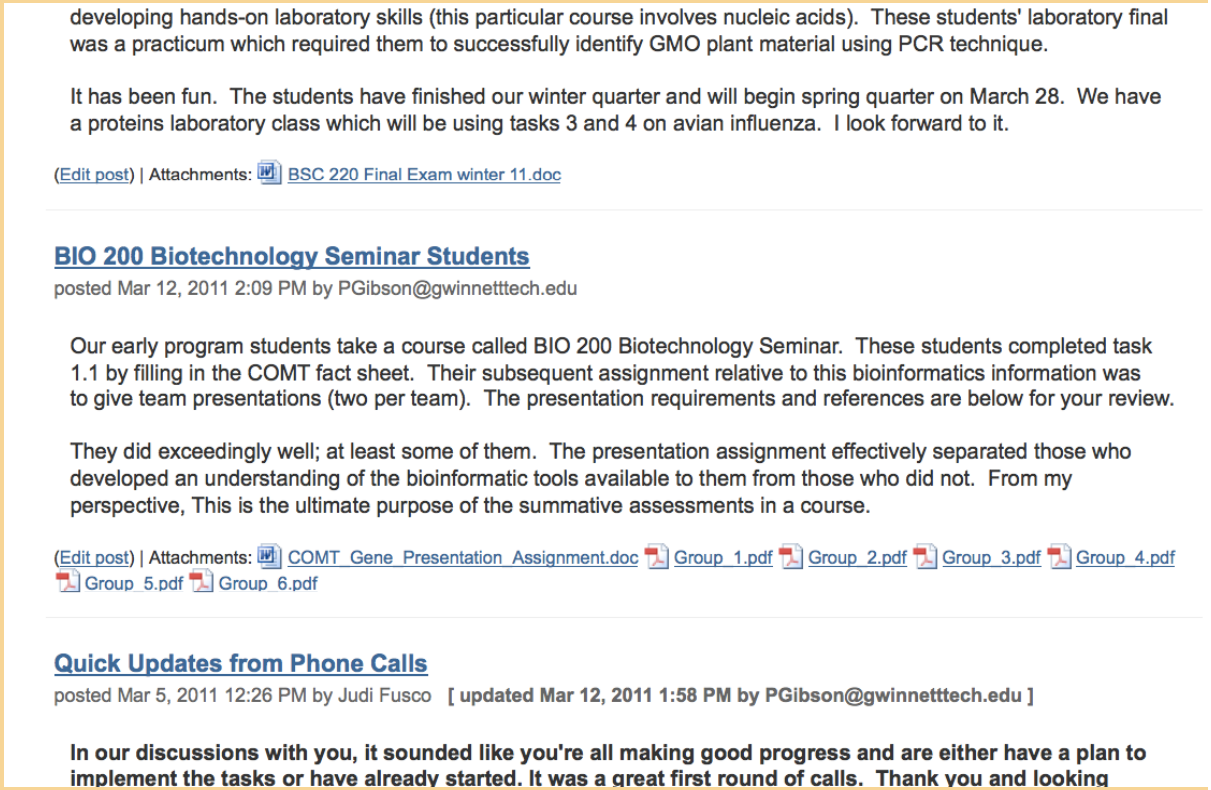
Faculty Check-ins (1 call each month: Feb-May)

- Researchers called Faculty Partners/Groups
  - Covered each of the themes in each phone call.
- Encouraged them to talk to each other
- Encouraged them to share on discussion board
- Findings about partner processes:
  - 5 groups
  - All groups shared resources and were very supportive and helpful in check-ins
  - Groups varied in how much conversation they engaged in between check-ins

Faculty engagement in PD Experience

Discussion Board

- Everyone participated
- 53 posts
- Posted syllabi, handouts, websites, videos
- Talked about what worked and didn't



developing hands-on laboratory skills (this particular course involves nucleic acids). These students' laboratory final was a practicum which required them to successfully identify GMO plant material using PCR technique.

It has been fun. The students have finished our winter quarter and will begin spring quarter on March 28. We have a proteins laboratory class which will be using tasks 3 and 4 on avian influenza. I look forward to it.

(Edit post) | Attachments: BSC 220 Final Exam winter 11.doc

BIO 200 Biotechnology Seminar Students

posted Mar 12, 2011 2:09 PM by PGibson@gwinnetttech.edu

Our early program students take a course called BIO 200 Biotechnology Seminar. These students completed task 1.1 by filling in the COMT fact sheet. Their subsequent assignment relative to this bioinformatics information was to give team presentations (two per team). The presentation requirements and references are below for your review.

They did exceedingly well; at least some of them. The presentation assignment effectively separated those who developed an understanding of the bioinformatic tools available to them from those who did not. From my perspective, This is the ultimate purpose of the summative assessments in a course.

(Edit post) | Attachments: COMT_Gene_Presentation_Assignment.doc Group_1.pdf Group_2.pdf Group_3.pdf Group_4.pdf Group_5.pdf Group_6.pdf

Quick Updates from Phone Calls

posted Mar 5, 2011 12:26 PM by Judi Fusco **[updated Mar 12, 2011 1:58 PM by PGibson@gwinnetttech.edu]**

In our discussions with you, it sounded like you're all making good progress and are either have a plan to implement the tasks or have already started. It was a great first round of calls. Thank you and looking

Faculty engagement in PD Experience

What Faculty accomplished:

- Everyone implemented at least some of the Bioinformatics SBL materials
  - Most instructors completed 2 or 3 tasks with their students (one did all 4 and two did 1)
- Instructors learned what worked and didn't
  - They learned where more context is needed or how they would change the tasks to make them fit in their courses better
- All faculty completed an inquiry cycle
  - Systematic

An Instructor's Experience

Ken Kubo

American River College

Teaching Bioinformatics and Biotechnology: Some Challenges

- Isolation in small biotechnology programs (often one full-time faculty)
- Integrating inquiry with learning tools and techniques
- Incorporating “soft-skills” into the classroom

Scenario-Based Learning (SBL): A faculty perspective

- What was appealing?
  - Inquiry-based
  - Authentic problem-solving
  - Workplace-oriented skills
- What was challenging?
  - How to incorporate SBL into my classes?
  - Fear factor: Will SBL really work with my students?

SBL Workshop Support

- Most helpful to me:
  - Faculty partners/teams
  - Check-ins offered ongoing support from researchers and faculty partners
  - Discussion board to share ideas and resource materials
  - Workshops revealed a wide breadth of perspectives
- Openness to share the ups and downs of SBL

My Faculty Inquiry Question

- How well do students learn similar bioinformatics knowledge and skills using SBL vs. current methods?
  - Student attitudes
  - Student learning

Two courses compared

- BIOT312 Biotechnology Laboratory Methods
  - Basic laboratory concepts and techniques
  - In-class laboratory course
  - **Intervention group: Use scenario-based learning (SBL) activities**

- BIOT305 Introduction to Bioinformatics
  - Introduction to bioinformatics concepts using web-based tools and databases
  - Online course
  - **Control group: No SBL activities**

Student information

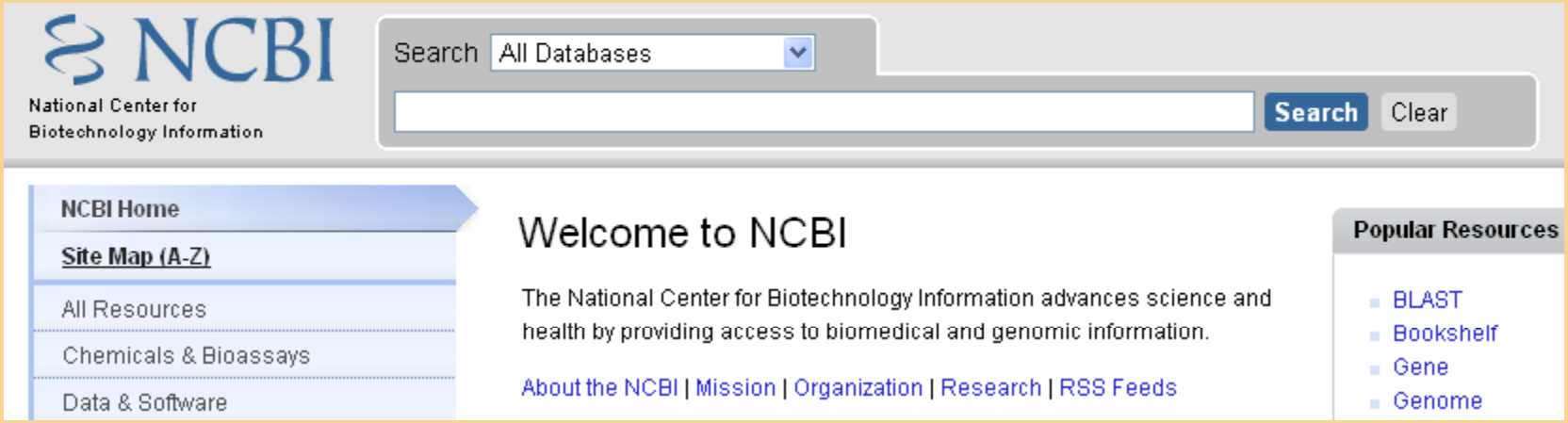
- Student numbers
  - BIOT312 Biotech Lab Methods: 19 community college students
  - BIOT305 Bioinformatics: 18 community college students
- Both classes:
  - Biology/Biotechnology majors, pre-nursing, pre-medical, and other areas
  - A few students with B.S. degrees (or higher) – interested in updating job skills

Test-driving SBL

- **Course: Biotech Lab Methods.** 1 hour lecture/3 hour lab per class session (meets twice per week for 8 weeks)
- **Before SBL (pre-March 2011)**
  - Small group work during lecture and lab
  - Bioinformatics usually not emphasized in this course
- **Test-driving SBL (post-March 2011)**
  - Some regular lab activities shortened or omitted to include SBL activities (~20% course laboratory hours committed to SBL)
  - SBL activities still address course student learning outcomes

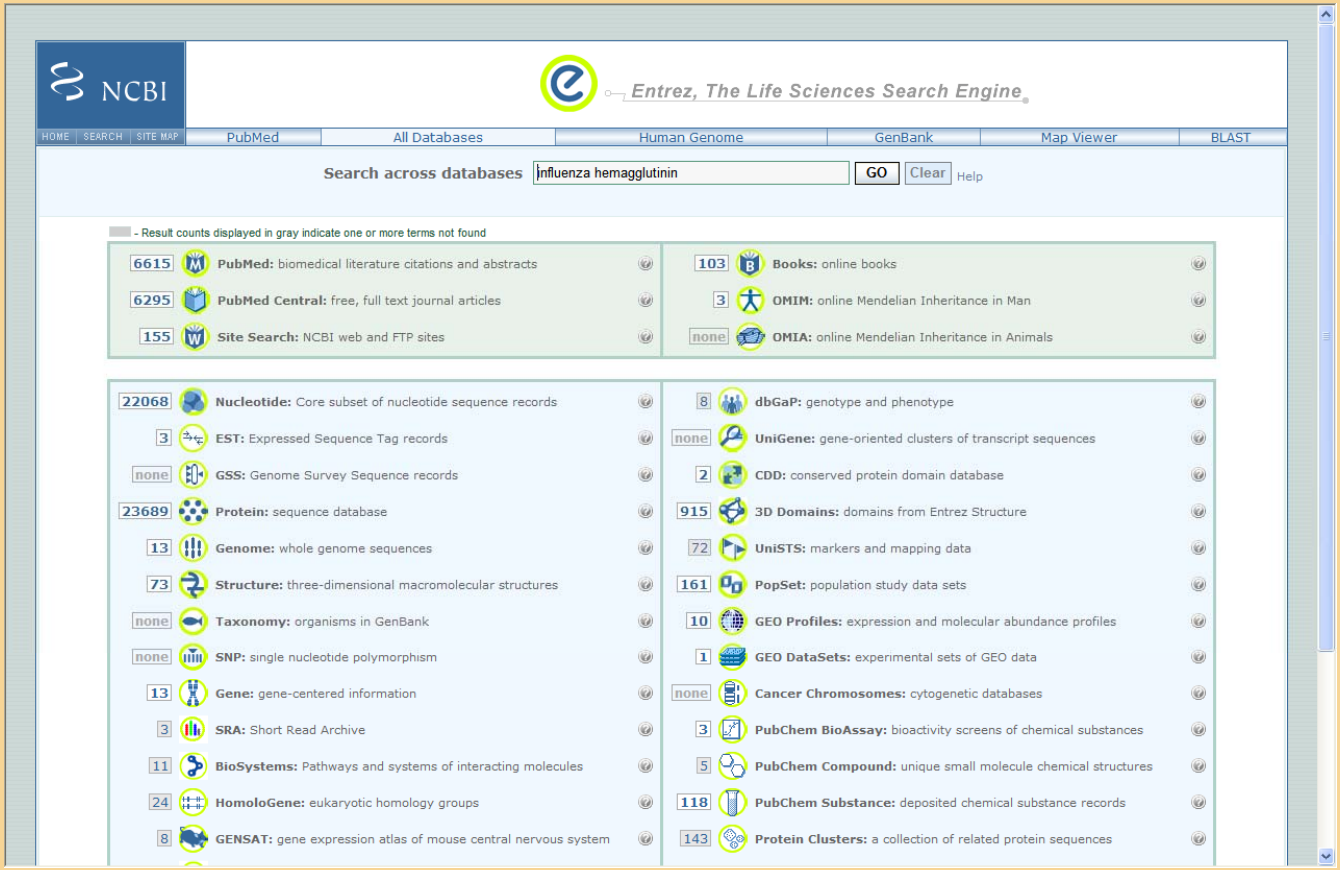
National Center for Biotechnology Information (NCBI)

- National resource for storing and analyzing information about molecular biology, biochemistry, and genetics



http://www.ncbi.nlm.nih.gov

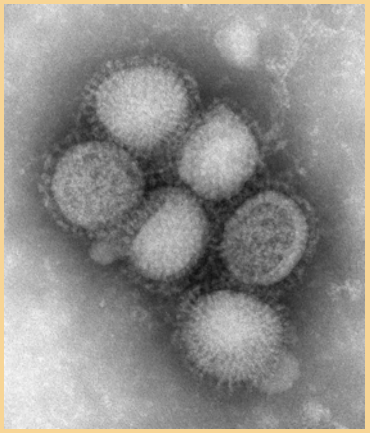
NCBI Databases



Real-world, but complex, information

Bioinformatics – SBL Activities

- Genetic testing for disease treatment – will it work?
- Computer analysis of influenza virus genetics – how do new viruses evolve (H1N1)?



H1N1 influenza virus

Bioinformatics – SBL Activities

Team projects

Group presentations

Data Collection

- Attitudes: Student surveys
  - Did they like SBL?
  - What would they change?
- Learning: Archive of student work
  - Presentations
  - Data tables and analysis
- Learning: Post-activity content questions
  - Concept application
  - Using databases

What students like about SBL

- *I liked that we were given a topic to research and by the end were able to pull together the info we needed. I feel this may help with future research.*

- *NCBI data base … was enlightening if not frustrating. It was interesting to get first hand exposure to the tools researchers create and use to assist in their research.*

Success with SBL

- *Our team was successful at following the work plan. We all found different information that we were able to put together. Since we each think differently, in the future I would use the same strategy that we did this time.*

What students did not like

- *I did not like that we were given so very little instruction and were expected to produce answers that in some cases were completely vague in their expectation and explanation.*

My Reflections on SBL

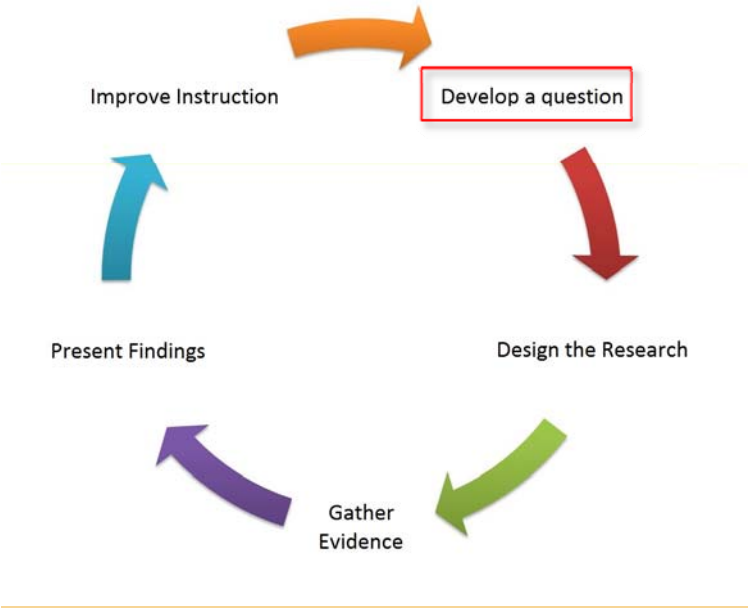
- Authentic, real-world questions that integrate content with
  - Teamwork
  - Communication
  - Problem-solving
- Student disequilibrium and pushback, but …
- Students using SBL learned just as much content as non-SBL students, even after this first try
- Faculty inquiry process makes assessment approachable

What's next?

- Integrate SBL group projects with laboratory activities
  - How do the DNA sequences and proteins used in your lab experiments relate to real-world research?
- Address some student concerns
  - More structure and focus in SBL tasks

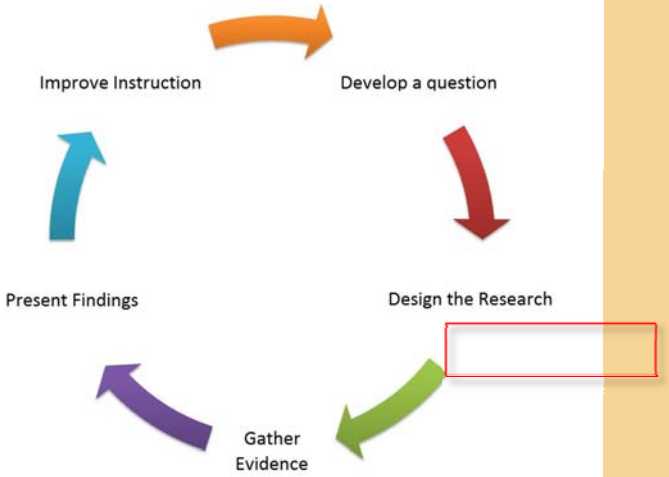
Interactive Test Drive

- Imagine your most challenging, active student lesson
- Pick a partner
- Discuss research questions to help you reflect on this lesson
- Choose evidence-gathering tools



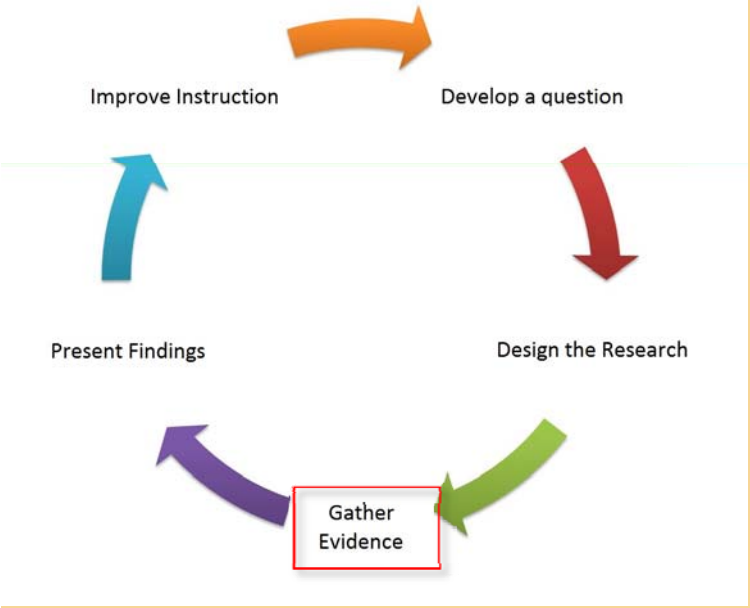
1. Develop a question

- Stay focused on a single issue.
- Strive for clarity.
- Match the question to the evidence.
- Does it fit observation?
- Does it invite deeper study?
- Is it shared by your colleagues?



2. Design the Research

- Match the research plan to the question.
- Focus on evidence from everyday work.
- Use what you're already doing.
- Find support through teamwork.
- Keep it simple!



3. Gather Evidence

1. Gallery of students' work.
2. Record classroom activity.
3. Assessments.
4. Dialogue with colleagues.
5. Student feedback.
6. Self-Journaling.
7. "Think-aloud."

Group Reflection

- Can you imagine using a faculty inquiry method in your class?
- Did you see any tools that you might use or have already used for gathering data?
- Can you imagine developing the faculty partner approach at your college? Or using an online environment to link with faculty at other colleges?