

Reflecting and Connecting Through Change and Technology: Undergraduate Genetics at the University of Florida

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ABSTRACT

Objectives:

To enhance and reinvigorate an undergraduate general genetics course by utilizing a course management system and updating the term project. Since 1996, a librarian has taught undergraduate genetics students to use online genetics/bioinformatics resources. As part of her collaboration with the class, she writes and grades assignments. As class size threatened to increase, it became essential to streamline the librarian's effort while retaining instructional rigor and updating the assignment.

Methods:

The librarian has been involved with the course since its inception, creating the term project and developing supporting searching assignments. In 2002 she co-authored an article describing the class and student perceptions (JMLA 90(2):180-93). By 2009, class size threatened to increase and the librarian's responsibilities to the library had expanded, requiring her to streamline her workload. Upon reflection, the term project had become a bit stale for students - just one more paper to write. To meet the needs of the instructors and students, a course management system was employed to automatically grade the three assignments. The single-authored term project evolved into a group-authored poster presentation, with instructional support from the library's graphic artist. Anecdotal information suggested that students prefer this arrangement. In 2010, students were formally surveyed concerning course changes.

Results and Conclusions:

Students presented their posters in the foyer of the HSC Library. Instructor feedback suggests that having the students present and defend their posters in public "encouraged" them to master the material more than in past years. Results of the student survey indicate that students prefer the poster to a written paper, and enjoy the group work aspects of the project.

Converting the assignments to an online format took approximately 20 hours the first semester, with the bulk of activity for the first assignment which is customized for each assigned disorder. Updating the assignments in subsequent semesters took less than 5 hours. Online grading saved the librarian approximately 25 hours/semester. The change to posters saved another 20-25 hours of grading time each for the librarian and the professor. Given the feedback, it appears that these changes have created a more productive and enjoyable learning experience for the students and instructors.

PCB3063 – UNDERGRADUATE GENETICS

- Mostly juniors and seniors
- Mostly life science majors (biological sciences, botany, zoology, nutrition, anthropology, microbiology, etc.)
- Approximately 120 students begin the course each semester; approximately 100 complete the course
- Course is 4 hours of lecture/week; no laboratory section
- Course grades consist of 3 exams and the term project (25% of grade)

Most time consuming aspect for librarian – 120 different disorders must be vetted and 120 different assessments created for Part A – one for each student in the class.

Part B and Part C can be created as generic assessments – all students complete the same Part B and Part C assessment.

All online assessments are timed. Students are given one chance to complete the assessment once they have started. It is essential that students complete each of the assessments on paper first, so that they are able to easily complete the timed version.

Time allowed:
Part A – 5 minutes
Part B – 15 minutes
Part C – 20 minutes

Poster URL: <http://bit.ly/cpgLxu>

PART A: IDENTIFICATION SHEET
GENETICS TERM PROJECT
DUE: 10 February 2009, noon, via E-Learning Quiz 5 points

Student's Name: _____

Name of disorder exactly as listed on sign-up tag: _____

Official title (name) of condition exactly as listed in Online Mendelian Inheritance in Man (OMIM): _____

Six digit entry number of disorder as listed in OMIM _____

All alternative titles or alternative symbols listed in OMIM: _____

Official Medical Subject Heading (MeSH) term exactly as found in PubMed's MeSH Database. (This is the official term you will use to search for your disorder in PubMed): _____

In Part A, students identify the official OMIM name and number for their assigned disorder, as well as its MeSH term. All 5 points are graded online.

Paper version of Part A translates into online version of Part A.

Part A - ACY2 Deficiency
Michael Mason Miyamoto
Started: January 27, 2009 11:52 AM
Questions: 4

1. (Points: 5)
Which of the following is the exact official title (name) of your assigned condition as listed in Online Mendelian Inheritance in Man (OMIM)?

a. ASPA DEFICIENCY
 b. CANAVAN DISEASE
 c. ASPARTYLASE DEFICIENCY
 d. CANAVAN-VAN BOGGAST-BERTHIAU DISEASE
 e. ASPARTYLASE 1 DEFICIENCY

Save Answer

Part B covers PubMed searching, in particular the use of MeSH, subheadings, and other advanced options. It also covers searching sequence databases such as NCBI's Nucleotide and RefSeq. 20 of 25 points can now be graded online. Hand grading is required for students' written defense of the papers that they choose as "best" to use for their final poster.

Part C concentrates on resources such as NCBI's Structure, MapViewer, dbSNP, and GeneReviews. Most of the questions are related to gene and protein structure. 17.5 of 25 points can now be graded online.

HSC's Graphic Artist instructs the class TAs how to create posters using PowerPoint. The TAs then hold office hours in the HSC's computer lab to assist students.

Part B
Demo Student
Started: April 22, 2009 11:17 AM
Questions: 10

1. (Points: 0-5)
Which of the following is TRUE concerning MeSH searching?

a. MeSH acts as a dictionary and helps the searcher find the official search term to use for a particular concept.
 b. Using a MeSH term retrieves ALL papers on a particular topic, regardless of how current the paper is.
 c. Once you have found a MeSH term you may then throw out peripheral papers and focus on a particular aspect of a topic (such as genetics or therapy).
 d. Both A and B are correct.
 e. Both A and C are correct

Save Answer

2. (Points: 0-5)
Which of the following is TRUE concerning keyword searching in PubMed?

a. You should try every synonym and spelling variant that you can think of if you hope to have good retrieval in a keyword search.
 b. Keyword searches are usually less accurate than MeSH searches, but will retrieve articles more current than those retrieved from MeSH.
 c. It is important to perform a good MeSH search, and then do a keyword search to pick up newer articles; but the keyword search should only be performed in the "in process" part of PubMed.
 d. All of the above statements are true.
 e. None of the above statements are true.

Save Answer

Part C
Demo Student
Started: April 22, 2009 2:38 PM
Questions: 3

1. (Points: 0-5)
What is the PDB number for this record?

a. 1A5H
 b. 234V
 c. 4CLN
 d. 1ZAA
 e. 1C3B

Save Answer

2. (Points: 1)
Which experimental method was used to elucidate the structure?

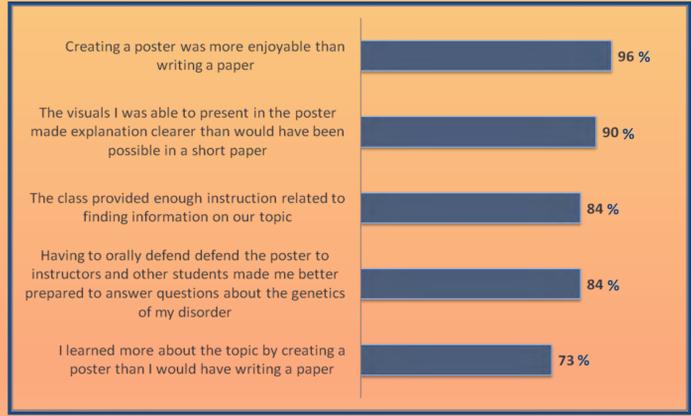
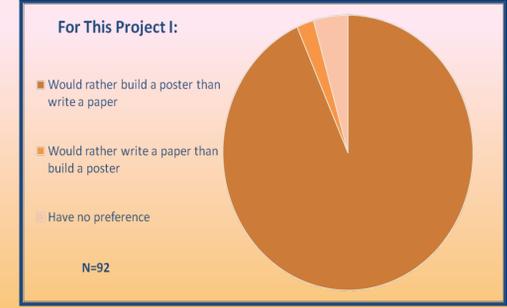
a. Nuclear Magnetic Resonance
 b. Computational Prediction
 c. X-Ray Crystallography
 d. Electrophoresis
 e. Sanger Sequencing

Save Answer

3. (Points: 0-5)
In what journal was this structure reported?

a. Journal of Biological Chemistry
 b. Nature
 c. Cell
 d. Science
 e. PNAS

Save Answer



2009 Best Poster Award
Chosen by students in PCB3063
Winning authors: Joseph Combs, Genevieve Ochs, and Luis Ortiz

- ### Advantages of class changes:
- Students like the poster project better and indicate they learn more
 - Provide students with an opportunity to work as part of a team
 - Students are ensured the disorder they present has sufficient information, as group members choose among the four they were individually assigned
 - Give students the opportunity to evaluate contributions of their peers
 - Provide students with the experience of orally answering questions about their disorders
 - Give students the experience of building a poster
 - Save grading time for the librarian and the professor
 - Presentations in the library showcase the library as a partner in education
- ### Disadvantages of class changes:
- Students no longer gain the experience of writing a paper
 - Some groups work better than others
 - Creating 120 online assessments for Part A can be time consuming, but these assessments can be reused every semester