1. Course Description and Project Objectives

This Genetics course is an intensive two-part course designed as an introduction to Genetics and Genomics. It includes a separate lecture and laboratory portion which are recommended to be taken concurrently.

The lecture class consists of several in-class quizzes, three prelims and a final exam. The lab course consists of several quizzes, and five microbial laboratory reports and a microbial exam. In addition there is an intensive Fly experiment that culminates in a take-home and an in-class exam.

Project Objectives

- The goal of this project is to better understand the role of optional problem-solving sessions offered to students in the laboratory and lecture course and how the sessions affect student learning.
- Problem-solving session handouts are given to students each week to work on during their own time.

2. Methods

Participants in this study are all undergraduate students at the Cornell University enrolled in the laboratory course associated with the Genetics and Genomics Introductory course.

There are seven total sections comprising the laboratory course. Surveys were given to live out of the seven course sections as scheduling permitted.

The surveys included demographic information questions, full in the blank questions, Likert scale questions and open-ended questions.

The survey was given in paper form at the start of class. Student response rate was 100% for each section (n=103), however students did leave various questions blank on occasion.

Data analysis was performed by linking survey responses with student prelim scores while excluding any unanswered questions. Therefore, any percentages are based off of the surveys with a response in the given category.

Demographic information was grouped according to more general terms when students were very specific (i.e. specific ethnicity was grouped into broader categories as best as possible).

Because the preliminary exams used as data were given in the associated lecture course (n=220) the mean values represent students who are not all enrolled in the laboratory course (n=150).

3. Student Body

The course is not offered to first-semester freshmen and freshmen in general are discouraged from taking the course.

Student race was self-reported and grouped as necessary. Overall, the student body for the course is primarily White, followed closely by Asian, then Hispanic, and then other ethnicities.

Males and females enrolled in the course were nearly even, with women representing 1% more of the student body than men.

Age was distributed between 18-23 with 43% of the students self-identifying as 21 years of age.

Student GPA was self-reported, showing a trend approaching a 4.0 (This may be somewhat inflated as self-reported prelim 1 grades showed a full 4% higher average than actual prelim 1 grades).

3.1. Senior

- 16)

3.2. Sophomore

- 21

3.3. Junior

- 21

3.4. Freshman

- 2%

3.5. Other

- 1%

Student Race

- Asia 35%

- White 41%

- Hispanic 1%

- Other 1%

4. Student Effort Factors

Student effort towards the course was evaluated primarily by two questions.

Optional problem-solving sessions were offered weekly by the course coordinator and focused on the concepts and techniques for solving genetics problems. Most students attended in a binomial manner tending towards the extreme ends.

As a separate measure, students reported their hours spent studying for the course in an average week. This trended between 3-5 hours.

5. Student Perspective on Problem-Solving

Students had a mixed view of the usefulness of the optional problem-solving sessions towards the laboratory course.

Students opinions of the usefulness of the problem-solving sessions towards the lecture course were overall positive, often citing a similarity of the problem solving sessions to the prelim exams.

Interestingly, the student views towards both courses as a whole matched opinions on the lecture course rather than being a hybridization of the both trends as was expected.

6. Student Confidence

Students had an overall positive attitude towards the problem-solving sessions, with responses such as…

“If I feel the optional problem-solving sessions will help me practice and improve my genetics skills and help me to do well in the course.”

“I feel I am doing well in the lab”

8. Summary and Qualitative Data

Students had a mixed perspective of the usefulness of the optional problem-solving sessions attended by students attending nearly all (9-10) of the problem solving sessions showed higher performance on their preliminary exams.

Interestingly, students attending between 6 and 8 problem solving sessions performed below the class mean, while students attending fewer sessions scored marginally above the class mean.

7. Problem-Solving Shows Mixed but Positive Results

Performance vs. Effort

7.1. Prelims Grouped by Problem-Solving Sessions Attended

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Interestingly, students attending between 6 and 8 problem solving sessions performed below the class mean, while students attending fewer sessions scored marginally above the class mean.

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