ComGen: The Community College Genomics Research Initiative
The Mini-Graduate School Experience

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Project #: 0717470
Type: Phase II—Expansion
Target Discipline: Biological Sciences
Focus: Creating Learning Materials and Teaching Strategies

Our goal is to remove any real or perceived barriers between community college students and rewarding careers in scientific research.

We provide a mini-graduate school experience, helping students make the transition from passive learner to engaged, creative participant in the scientific community.

Students gain hands-on research experience on real-life scientific problems. They learn the latest techniques in genomic technology, and meet with world-class research scientists.

We record and evaluate our successes, noting where improvements may be made, leading to modular curriculum units that can be used at community colleges nationwide.

Our teaching has already lead to improvements of facilities at BCC including...

Early student assessment and assistance
Preparatory education is provided to bring some students up to the required starting level.

Diagram and explain
Students are assigned diagrams the night before the class, then collaborate in groups to produce a single diagram. This leads to better understanding of the material. Students are expected to connect lab protocols and theory.

Class discussions lead to better understanding than assigned class readings

Laboratory experience
Videos and animations provide especially effective introductions
Students analyzed any mistakes, then repeated their experiments
They learn from producing their own lab solutions (and reduces costs)
We found that students are more involved when adequate supplies minimize waiting times

Journal club/Seminar
At first, students find it difficult to understand a scientific journal article well enough to teach it to the class. As they work through their initial difficulty their comfort with scientific nomenclature increases and they are rewarded by new perceptions of themselves as skilled learners.

Guest Speakers
An essential part of our program, meeting with working scientists allows students to see the person behind the laboratory report.

We hosted Dr. Weller (Research Leader, Root Disease and Biological Control Unit, USDA-ARS) on the impact of this student research, and Ms. Stephanie Tatem Murphy (Geospiza Corporation) on bioinformatics in Spring 2008.

Regional Outreach
Contributors to WA state research “Pumping-Up the Math and Science Pipeline: Grade School to College”, including Native American students at Skwant Summer Science Camp, monthly science instruction in Colville Reservation schools, and summer science internships for Colville Reservation students.

Course Assessment
A course portfolio includes sections for each week with class overviews, handouts, and ideas for next iteration of class.

An end-of-course assessment focus group collects student views on the impact of this course on their sense of themselves as scientists and learners.

Student Assessment
Take home exams
Drawings to demonstrate understanding:
how to generate a genomic library
sequencing a genome
pyrosequencing methods
Protocol & procedure analyses
Oral exams

“Most teachers say they will use the Socratic Method, but they don’t. You stayed with it throughout the class and that was great.”
-Student B.

Students spoke of suddenly being able to understand specialized vocabulary of guest speakers -- something that makes them feel like members of the community of scientists.

References
W.H. Freeman & Company.

Web site http://scidiv.bcc.ctc.edu/Comgen