SUCCESS with an Undergraduate Science Research Course
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URE Type: Undergraduate Research Course STEM Focus: Multidisciplinary
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ABSTRACT
An NIH Institutional Research and Career Development (IRACDA) collaboration between Suffolk County Community College (SCCC) and Stony Brook University (SBU) led to the design and implementation of an online science research course, based on the SENCER approach in which students identify a civic problem and solve it through the application of STEM knowledge. The SENCER approach has also led to the modification of several science lab courses. The online course asks students to apply scientific techniques to their ideas as they investigate today’s dilemmas in areas such as energy, health, and the environment. Students enrolled in this online research methods course were introduced to several aspects of scientific research, including networking with practicing scientists, thinking about ethics in the context of research, interpreting and analyzing statistics, and reviewing current literature topics in multidisciplinary STEM fields. This course empowers students while strengthening team communications and collaborations, peer reviewing and critiquing skills.

RESEARCH QUESTIONS
We are exploring specific questions related to the online modality. Does an online interdisciplinary research methods course focused upon authentic issues:
- assist students with their research?
- enhance acquisition of transferable skills - teamwork, presentation skills, and scientific writing skills?
- promote scientific inquiry and discourse?

METHODOLOGY

Online Introduction to Research Methods Course
- Developed at the Blackboard platform by SCCC faculty and an SBU IRACDA Teaching Fellow. It serves as a companion course for student research interns or as a means to accrue academic credits and research project experience. Students are empowered and enabled to further develop a range of transferable skills, particularly teamwork, oral communication, presentation skills, and scientific writing.

We find our community college student researchers perform better academically than their peers who chose a more traditional path, and that success in STEM encourages increased persistence of underrepresented populations in college and beyond to STEM careers or higher STEM education.

Finally, the results of our research to date point to positive implications for the mentoring of our community college research scholars by our NIH IRACDA postdoctoral faculty and our prospective NSF Alliances for Graduate Education and the Professorate (AGEP) teaching assistants.

WHY ONLINE LEARNING? WHY A RESEARCH COURSE?

Elements of online learning:
- Learner relevance
- Active learning
- Learner autonomy
- Technology competence

Rationale for a Research Course:
- Absence of advanced seminar or research component at SCCC.
- Absence of interdisciplinary STEM research course at SCCC.

Knowledge Generation:
- Students benefit from relationships with tutors and mentors.
- When compared to Suffolk’s STEM students, SCCC STEM students perform better academically than their peers who chose a more traditional path, and SCCC STEM GPA, Fall 2016.
- Students participating in off-campus summer research remained engaged through participating in an online Introduction to Science Research course.

 Indoctrination to Research, Summer 2019: Pre-course survey

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Conclusions:
- Students feel engaged and motivated to succeed.
- SCCC SUCCESS Cohort GPA vs. SCCC STEM GPA, Fall 2016-2018

THE STEM COMMUNITY AT SCCC

CONCLUSIONS
- SCCC is a robust program with indications of a very successful implementation.
- SCCC students perform better academically than their peers.
- The online Introduction to Science Research course engages students and contributes to student empowerment and persistence.
- Mentors and faculty provide continuous support.
- The SENCER Student Assessment of Learning Gains results indicate an increase in motivation, metacognition and progress toward course and programmatic goals.

Any opinions, findings, and conclusions or recommendations are those of the authors and do not necessarily reflect the views of the National Science Foundation or the National Institutes of Health.