

Mentored Research at a Community College **PVCC's Science Capstone Course**

Piedmont Virginia Community College Joanna R. Vondrasek



Why Mentored Research?

"Undergraduate students who participate in hands-on research are more likely to pursue advanced degrees and careers in science, technology, engineering and mathematics (STEM) fields..."

-- National Science Foundation

A Community College's Challenge

Mentored research with constraints on:

- Faculty time
- Funding



Administrative Structure

- One faculty member carries teaching credit for the combined Science 299 course each semester and facilitates group instruction and discussion (faculty drops one lab section)
- All full-time science faculty members are available to mentor 1-3 students a semester in their discipline
- Faculty members receive one credit of tuition per ٠ student mentored (\$154 in 2019-20)
- Lab managers receive one credit of tuition per student mentored



Figure 2. Spring 2019 cohort: 26 students plus faculty attend first group meeting

Semester Structure

Seven meetings for all students completing course. Topics covered:

- Proposal development ۲
- Laboratory safety
- Experimental planning Progress reports/updates

Poster Presentations



Figure 4. Poster session builds confidence and creates community

Graduation Rates & Belonging in Science

Table 1. Markers of Success for Capstone Course Completers

Success Markers (2012-2015)	Percentage	Sample Size
Success in Capstone	82 %	49
Course (C or better)		
Capstone students	76 %	49
who graduate		
Graduates who	73 %	37
transfer to 4 yr school		
Total who transfor	040/	4.1

- Physical space
- Curricular space



- Figure 1. Campus-wide Poster Session 2019
- Student preparedness \bullet

PVCC's Science 299 Capstone Course

- Graduation requirement for A.S. in Physical ٠ & Natural Sciences at PVCC
- Students choose discipline (biology, ulletchemistry, geology, physics)
- Students plan and conduct an original • research project during one semester of their second year (2 credits) with guidance from faculty in chosen discipline
- Students gain professional skills and expand • scientific skills

- Data analysis ۲
- Poster construction

Students encouraged to build on lab activities from intro courses, on prior student projects



Figure 3: Left: Student conducts biology lab work during semester in biology prep room. Right: Student with physics project (bicycle water pump), delivered to local middle school garden

lotal who transfer 84 % 41 (includes graduates and non-graduates)



Figure 5. Increase in feelings of belonging to community of science in 2019 Capstone students (pre n=24, post n=21)





Acknowledgements: PVCC Science Faculty, Staff, Administration. Anne Allison, Melinda Clark, Donna Hoefner, Marlena Yost, Ginger York, John Walsh, Barbara Heyl, Frances Rees, Larry Tiezzi, Yana Goddard, Nathan DuPriest, Jennifer Scott, Rosalyn Koontz, Jessica Amos, Ed Funck, Elise Walsh, Ruth-Ann Acors, Kathy Hudson, Jean Chappell, John Donnelly. This program is supported by the National Science Foundation under Grant Number 1202181. Any opinions, findings, and conclusions or recommendations expressed in the program are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.