



2017

Change at the Core: A Collaborative Model for Undergraduate STEM Education Reform

Emily Borda

Western Washington University, emily.borda@wwu.edu

Edward Geary

Western Washington University, edward.geary@wwu.edu

Emily Schumacher

Western Washington University

Follow this and additional works at: https://cedar.wwu.edu/sotl_residency

 Part of the [Scholarship of Teaching and Learning Commons](#), and the [Science and Mathematics Education Commons](#)

Recommended Citation

Borda, Emily; Geary, Edward; and Schumacher, Emily, "Change at the Core: A Collaborative Model for Undergraduate STEM Education Reform" (2017). *Scholarship of Teaching and Learning Residency*. 4.
https://cedar.wwu.edu/sotl_residency/4

This Project is brought to you for free and open access by the Scholarship of Teaching and Learning at Western CEDAR. It has been accepted for inclusion in Scholarship of Teaching and Learning Residency by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.

Scholarship of Teaching & Learning (SoTL) Residency 2017 Project Summary

Authors

Emily Borda, Edward Geary, Emily Schumacher

Project Title

Change at the Core: A Collaborative Model for Undergraduate STEM Education Reform

Project Description

Change at the Core (C-Core) is a professional development project for Science, Technology, Engineering, and Math (STEM) faculty at WWU, WCC, and SVC. A summary of the project can be found [here](#). This project is funded by the National Science Foundation [DUE-1347711]. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Two projects were developed/worked on during the SoTL residency. The first, which studies C-Core at the faculty/classroom level, is centered around the following three research questions:

1. What changes did faculty make to their classroom instruction and learning environments to improve students' understanding of targeted ideas for their course? Why did they make these changes?
2. What supported or constrained the changes faculty attempted to make to their instruction?
3. How do faculty members' implementation of student-centered practices intersect with students' perceptions?

The second, which describes C-Core from an institutional view, focuses on the following questions:

1. To what extent does collaboration between faculty and administrators at 2- and 4-year institutions of higher education (around the C-Core model) lead to student-centered, inclusive learning becoming the "norm" at institutional, college, and departmental levels?
2. What are the benefits and challenges of collaboration between 2- and 4-year faculty and administrators?
3. What recommendations/guidance can the C-Core model offer to other institutions interested in transforming undergraduate STEM education, at scales larger than individual faculty/classrooms?

Project Design & Next Steps

Two projects related to C-Core represent study and descriptions of the project on different levels. The first, “Initial implementation of active learning strategies in large, lecture science courses,” describes implementation of student-centered learning practices in their classrooms. The second, “Change at the Core: An adaptive model for transforming undergraduate STEM education,” describes institutional change within a 3-institution system as a result of C-Core.

Initial implementation of active learning strategies in large, lecture science courses

This study looks at the effects of C-Core from a classroom level. We used a case study approach, combining data from faculty interviews, classroom videos, and student questionnaires, to get a detailed view of how four faculty C-Core participants began to transform their instruction in the first two years of C-Core. Survey data from STEM faculty (C-Core and non-C-Core participants) were used to gain a broader picture of the frequency of implementation of such practices throughout all three institutions. Prior to the residency the data were synthesized and some preliminary claims developed. During the residency, these activities were used to begin writing a manuscript for publication in a peer-reviewed journal.

Change at the Core: An adaptive model for transforming undergraduate STEM education

Our second C-Core publication focuses on how key decisions, processes, collaborations, resources, and champions at the Institutional, College, and Department/Division levels can help to overcome common barriers to change, and support the uptake and expansion of student-centered teaching and learning. The benefits and challenges of inter-institutional collaboration are discussed, and recommendations are made to faculty and administrators at other 2- and 4-Year Institutions of Higher Education who are interested in making similar transformations at their institutions.

At the SoTL workshop progress was made on the outline of what will be in the institutional transformation paper and on a preliminary abstract. Evidence that will be/has been collected and analyzed includes data on changes or shifts in policies, faculty classroom teaching observations, practices, resource allocations, and administrative support.