



Work in Progress: Collaborating with Faculty Development in Retention Improvement

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WIP: A Conversation on collaborating with faculty development in student retention improvement efforts

Abstract

This Work in Progress describes an exploration of the roles that faculty development play in educational reform to increase student retention in engineering programs and student success in STEM courses. With improvements in student retention at the University of Southern Indiana (a regional comprehensive state institution) through student support programs, attention is shifting to changes in the curriculum, instruction and academic policies as complementary efforts. This provides opportunities for those in faculty development to collaborate with departments and colleges in these student retention efforts. The project's goal is to increase the participating faculty members' understanding of bottlenecks and factors impeding student progress at USI and knowledge about evidence-based student retention and instructional practices. The project includes efforts at the systems level via collaborative activities and at the faculty level via individual projects. The project structure is comprised of the components of collaborative inquiry, systems thinking, and participatory action research.

This Work in Progress seeks feedback from the community on ways to strategically collaborate with faculty, chairs, administrators, and other offices on improving student retention. During the presentation (poster session), attendees will be invited to contribute their perspectives by drafting a systems model. The community also will have access to a shared online document that compiles resources related to student success and retention and the materials generated during the session and that provides a space for discussion.

Introduction

This Work in Progress describes an exploration of the roles that faculty development play in educational reform to increase student retention in engineering programs and support student success in STEM courses. Focus in recent years on the recruitment and retention of diverse student populations in engineering and other STEM programs is evident in the number of reports that highlight its importance, declare calls to action and identify critical factors that impact student retention [1-2]. Additional motivation for institutions to address student retention has been provided by funding opportunities (such as those from the National Science Foundation, Gates Foundation, Howard Hughes Medical Institute, American Association of Universities) and state funding models that include the number and type of degrees awarded. High-impact educational practices that evidence improvements in the retention and graduation of STEM students from diverse backgrounds have been identified [3]. A broad set of institutions have developed and implemented programs aimed that include these high impact practices to address challenges to the retention of their students. For example, programs include student support services, enhanced advising, and cohort-based programs and some also address curricular challenges to student success, such as by revising the curriculum (e.g., course sequencing and content) and using evidence-based instructional practices [4]. This provides opportunities for faculty development to become involved; in fact, recent recommendations call to amplify the

influence of faculty development centers (or centers for teaching and learning, CTLs) to become “an institutional player on campus” [5].

Context and Rationale

With improvements in student retention at the University of Southern Indiana, which is a public, regional comprehensive institution, related to the implementation of multiple student support and early alert programs, overseen outside of academic programs, attention is shifting to changes in the curriculum, instruction and academic policies as complementary efforts to improve student retention. This provides opportunities for the faculty development center (e.g., center for teaching and learning, CTL) to collaborate with departments and colleges in these student retention efforts. This process of developing and sustaining collaborations between the CTL, department chairs, faculty members, administration, and other units in efforts to improve student retention in STEM courses is grounded in educational change strategies and motivation theory. Using as starting points the four types of change strategies (disseminating curriculum and pedagogy, enacting policy, developing reflective teachers, and developing a shared vision) [6-7] and expectancy-value theory of motivation [8], the Center for Excellence in Teaching and Learning (CETL) at USI is leveraging its networks and programs to intentionally initiate and facilitate conversations around student retention with different groups. Faculty development often is engaged in disseminating pedagogy through workshops, programs, and consultations with the CTL. How else might the CTL be involved through additional change strategies and be part of the process and conversation?

This work in progress describes the approach the CETL at USI is taking to be part of the conversations and working groups that contribute to retention and academic success of our engineering students. A systematic plan has been developed to proactively involve CETL in processes with faculty and academic units to gain deeper understanding of student success challenges, develop buy-in, articulate retention goals, and help faculty identify the need and opportunities for improving their instructional practices.

Project Plan and Process

A pilot project within the Pott College of Science, Engineering, and Education at USI is underway to lay the groundwork for the development and implementation of changes to curriculum and pedagogy with the goal of improving student success and retention. Rather than directly jumping into implementing solutions, this project starts with a broader, systems-level perspective by facilitating the project team’s deep dive into the current literature and landscape, across higher education and within our institution, on factors that support and hinder student academic success. This leverages the systems thinking, which is rooted engineering, into a project that addresses the complex problem of student success. The project team consists of five tenure-track or tenured faculty members in engineering, mathematics, physics, and geology, and among the project team is a department chair and the CETL director, who leads the project.

The project’s goal is to increase the participating faculty members' understanding of bottlenecks and factors impeding student progress at USI and knowledge about evidence-based student retention and instructional practices. The short-term goal is to complete structured inquiries, at

the systems and individual faculty levels, that will help to identify pathways and bottlenecks to student success in STEM courses as well as conduct faculty-driven action research projects of instructional interventions. The results of this project will support long-term retention goals and inform strategies to improve student success and retention across STEM courses, including those within engineering.

The project objectives are to:

1. Apply a systems approach to understanding student success and retention in STEM courses that includes course data (e.g., DFW rates and repeats) and academic policies and practices;
2. Develop and apply a framework to identify bottleneck courses, policies, and practices that impede retention and recommend potential solution areas;
3. Advance participants' knowledge of factors that impact student success and retention; and
4. Disseminate project results and products across the institution and faculty development community.

The project includes efforts at two scales: systems level via collaborative activities and faculty level via individual projects focused on one's courses. The project structure is comprised of the following key components:

- Collaborative inquiry (Phase 1): The team of five faculty members are collaboratively gaining a deeper understanding of student success efforts at USI and exploring retention and course DFW rate and repeat data, and academic policies and practices. The cohort meets regularly to share and discuss findings and the literature, develop an understanding of different perspectives, and develop the systems map and data analysis framework.
- Systems thinking (Phases 1 and 3): A systems thinking approach is being used throughout the project to explore the interdependencies and connections between elements around a goal of improving student retention in STEM. This frames student success and retention in a broader perspective and helps to identify bottlenecks, pathways, and potential solutions specific to the institution.
- Participatory action research (Phases 2 and 3): The action research process is intended to help instructors identify problems and investigate and refine solutions through inquiry within one's teaching practice. Each faculty's action research addresses the common goal of improving student success and retention in STEM courses.

Current Status

During Phase 1 (spring 2018), a foundation is being created by the project team gaining a common understanding of the literature on student retention as well as programs and policies existing at USI aimed to address student success and retention. This is used to collaboratively develop a framework for course data analysis and an initial systems map of student success and retention in STEM. Through systems mapping, interdependent elements, such as student support programs and curricular structures, related to the complex system of improving student success and retention are identified along with the connections and sequences between them. The

systems map provides a graphical representation of feedback loops, causality, and interdependence provides insights that contribute to identifying opportunities [9] and bottlenecks within the system. Outputs from Phase 1 so far include 1) a list of questions and hypotheses that the team has generated through the readings and discussions, 2) an initial annotated bibliography, and 3) an initial team systems map. The team is using the systems mapping and review of the literature and institutional policies to develop hypotheses or questions for individual action research projects that share common goals of improving student success and retention, which will be further developed during Phase 2 (summer 2018) and implemented in Phase 3 (fall 2018).

During Phase 2, the team is exploring disaggregated course data (e.g., repeats and DFW rates) for an initial set of STEM gateway courses required for engineering students to identify potential factors to student success as well as better understand success rates among student populations. Examples of disaggregates include student gender, race/ethnicity, first generation, Pell eligible, course scheduling, course enrollment, number of course repeats, and semester sequence [10]. The metrics and techniques described [2] to identify bottlenecks courses, such as course fill date (when maximum enrollment is reached), course enrollment and DFW rate thresholds, and course sequencing, also are applied. The team is using this data analysis and systems mapping to develop hypotheses or questions and potential solutions for individual action research projects that share common goals of improving student success and retention.

With regard to distribution of effort in this project, the initial phase is led by the CTL member who is responsible for leading the coordination efforts. This include establishing the logistics for bi-weekly meetings, overseeing project management using the online collaboration tools Trello [12] and SharePoint, leading the systems mapping activities, providing guidelines for the individual and team project outputs, and documenting the process. Nevertheless, this project is designed as a collaborative effort, in which each team member has the same roles as investigators and contributions to the collective understanding and framework development. This aligns with the overall goal of the project. As the project progresses, particularly when faculty members engage in their individual projects, the efforts will shift.

Seeking Community Feedback

This Work in Progress seeks feedback from the community on ways to strategically collaborate with faculty, chairs, administrators, and other offices on improving student retention through efforts that might include changes in instruction, curricula, and policy. Suggestions from the community on examples of related efforts at other institutions are appreciated as well. During the presentation (poster session), attendees will be invited to engage in the topic by developing an iceberg model (i.e., a systems thinking tool to help elucidate underlying structures and mental models) [13] and comment on the iceberg models created by other attendees and the systems map developed by the project team. The initial group systems map, as well as individual maps for each participant's project, will be shared. The community also will have access to a shared online document that compiles resources related to student success and retention and the materials generated during the session and provides a space for discussion. The web link will be provided in the final paper.

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