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Professional Development for Non-Tenure-Track Faculty in STEM at the University of Colorado Boulder

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✓ Learning Community

✓ Annual Symposium

✓ Discussion Group

✓ Course Transformation Grants

University of Colorado Boulder is a large, public university in Boulder, CO. It is the flagship university of the University of Colorado system and has a number of colleges within it that operate a plethora of undergraduate, graduate, and research programs. More than 50% of faculty are non-tenure-track (NTTF): approximately 37% are part time, with an additional 15% in full-time annual contracts. The institution created a Center for Teaching and Learning (CTL) in 2020 to help support faculty on the campus. There is also a Center for STEM Learning (CSL), housed within the Graduate School, that focuses specifically on providing an interdisciplinary community and resources for STEM education research and reform, including about 45 programs and departments across four colleges/schools.

A number of researchers work within CSL through various grants related to improving STEM education. One such grant was Transforming Education, Supporting Teaching and Learning Excellence (TRESTLE), a seven-institution project funded by the National Science Foundation from 2015-2020. The TRESTLE project focused on increasing use of research-based instructional practices through embedded expertise within departments to support course redesign, examining how interventions can be scaled at different types of institutions, and the building of communities within and across campuses to increase the impact of course transformation. This case study details the professional development initiatives developed within TRESTLE at CU Boulder, providing an example of how offerings were tailored at one institution in order to meet TRESTLE's cross-institutional objectives.

Professional Development Initiatives for NTTF

Prior to the creation of the new CTL, most institution-wide professional development opportunities (through the Faculty Teaching Excellence Center) were limited to tenured and tenure-track faculty. To meet the needs of all faculty, the professional development initiatives offered through TRESTLE at CU were intentionally open to NTTF. We focus on four initiatives offered as part of TRESTLE: discussion groups, an annual symposium, Scholar Learning Communities, and course transformation awards. Each initiative was designed to strengthen embedded expertise within STEM departments.

Discussion Groups

The monthly discussion series focused on discussing the classroom application of research-based education techniques specific to STEM disciplines. The purpose of the discussions was to provide more informal opportunities for faculty

across different STEM disciplines to reflect on readings, share teaching ideas, and receive feedback about instructional practices from other faculty members. Topics changed for each meeting and covered a wide range of issues, including flipping classrooms, problem-based learning, and metacognition. Discussions, which were facilitated by CSL staff or by faculty who had participated in the Scholar Learning Communities, emphasized applying research to practice. There were usually about 5-15 faculty members at each meeting.

Annual Symposium

An annual educational symposium was used to showcase STEM faculty members' course reform work as a result of these professional development initiatives. Symposia were usually around 4 hours long and used a flexible format, including panel discussions, research presentations, roundtable discussions, and poster sessions where faculty members highlighted their course redesigns and educational research.

Course Transformation Grants

Two types of grants were also available to faculty to support course redesign efforts through TRESTLE at CU. Two large course development grants (up to \$10,000) were available each year for a collaborative project to strengthen faculty's existing expertise in educational effectiveness and improve students' outcomes. Projects focused on curricular alignment across courses in a major, redesign of an introductory-level course, or creating a new course. In addition, faculty members could individually apply for mini-seed grants (up to \$1,000) to support smaller efforts which supported the goal of course redesign with a focus on active learning and/or assessment. For both grants, projects were required to demonstrate the potential for impact on other faculty members or departments.

Learning Community

The TRESTLE Scholars learning community (LCs) was a semester-long initiative with interdisciplinary groups focused on one topic that provided STEM faculty with more sustained opportunities for professional development and community. Groups met in person every other week, for a total of about 7-8 meetings per semester. As part of the LCs, participants completed an individual or collaborative final project. For instance, participants in the LC on course-based undergraduate research experiences collaboratively authored a white paper that advocated for greater funding of these experiences on campus. In the LC focused on using metacognition in the classroom, participants individually developed and implemented an in-class activity to support students' metacognitive skills; their deliverable was a written description of the activity, along with any supplementary resources, and a reflection about the effectiveness of implementation. Participants were also expected to formally present their project to other faculty in their department as one way of spreading and amplifying messages from the work.

LCs were facilitated by 1-2 staff and/or faculty members. Meetings typically occurred for about an hour and a half in the late afternoons (i.e., 4:00 to 5:30 PM) to accommodate busy faculty. During each meeting, participants discussed brief readings they had completed between meetings and then shared information and ideas related to their work applying the messages from the LC, or the final project. Participants who missed no more than two meetings and who completed their final project received a letter of acknowledgement, a copy of which was also sent to their department chair.



Assessment of Effectiveness

The seven institutions participating in TRESTLE designed a unified approach to assessment. Recipients of course transformation awards or mini-grants completed a report on their work. At each institution, faculty who engaged in professional development through TRESTLE and a random sample of those who didn't were invited to complete surveys annually that were designed to assess potential change in instructional practices and the climate for instructional improvement. In addition, LC participants completed a post-survey focused on effectiveness of learning activities and satisfaction with the experience, and facilitators developed written materials that included information about the group planning, structure, resources used, meeting agendas, and final projects, as well as guided reflections about what worked well, challenges faced, and lessons learned. The purpose of these materials was to provide guidance to future facilitators of LCs.

Additionally, the TRESTLE network created opportunities for faculty members at CU Boulder to develop expertise and community across institutions. Virtual brown bag discussions were held one or two times per semester; participating institutions rotated to lead presentations and discussions. TRESTLE also held an in-person annual meeting and course transformation institute on one of the campuses each summer, with several faculty members from each institution in attendance.

Lessons Learned

Over time, the TRESTLE PI and LC facilitators made changes to the LCs to better meet the needs of their faculty. In particular, they addressed challenges to participation NTTF faced in terms of motivation, timing, amount of effort required, and the recruitment approach. Here we highlight a few of those changes.

- Making meetings accessible to NTTF, who often have heavy course loads, was an ongoing challenge. They found that holding meetings in the early evenings was most inclusive. Additionally, attendance requirements were intentionally realistic, so that faculty could miss up to two meetings.
- LC applicants were initially expected to complete a memorandum of understanding that required a chair's signature for participation, but this raised issues of power and inclusivity for some faculty, so this requirement was eliminated but still available as an option.
- Facilitators had to rethink their expectations related to the amount of reading and activities outside of meetings faculty could complete, especially given the heavy teaching loads of NTTF.
- As LCs were open to all faculty, there was often a mix of tenured, tenure-track, and NTTF; newer and more experienced faculty; and faculty with varying levels of expertise in instructional effectiveness. They found that having two facilitators for each LC helped to create a more equitable community. In particular, they found that having a facilitator with expertise in STEM instructional practices and another with expertise in education was particularly effective for leading high-quality and inclusive discussions.
- The letter recognizing participation in an LC was particularly important to NTTF to demonstrate their ongoing engagement and learning, which they used to support their ongoing employment.



Best Practices for Inclusivity of NTTF

The suite of professional development offered through TRESTLE at CU Boulder demonstrates several best practices related to the inclusivity of NTTF, especially in terms of being welcoming of adjunct faculty.

- ✓ Advertisements for all TRESTLE activities made it clear that NTTF were welcome to join, acknowledging their presence at the institution and extending a clear welcome to them.
- ✓ Yearly symposiums allowed NTTF the chance to present course reform efforts to other faculty at the institution, helping them to make connections and raise their profile.
- ✓ The practice-focused design of the informal discussion series and the drop-in format made instructional development more accessible to NTTF and helped them develop a sense of community while learning STEM-specific approaches to teaching that could help them become more effective instructors.
- ✓ Course transformation grants supported NTTF's development of educational expertise through department- and program-specific professional development activities.
- ✓ The LCs included a mix of faculty across career tracks, with the goal of creating cultural change for effective instructional practice by connecting NTTF with tenured and tenure-track faculty in their departments.
- ✓ As participation in LCs was entirely voluntary, facilitators were careful to limit the amount of work and readings required to keep faculty motivated yet not too overwhelmed with outside work.

Professional Development Initiative Design Summary

In this section, we highlight the design of the **Scholar Learning Community**, as it effectively supports the professional development of part-time, non-tenure track faculty through sustained opportunities for learning and community related to teaching effectiveness.

PURPOSE AND OBJECTIVES: To develop embedded expertise in STEM education effectiveness within the university by supporting all faculty, especially NTTF in their teaching skills and professional development and ensuring these NTTF felt included and a part of the community.

PARTICIPANTS: A mix of faculty from different STEM disciplines, career tracks, experience at the institution, etc.

DELIVERY MODE: In-person meetings every other week.

STRUCTURE AND LENGTH: Meetings were about an hour and a half long and included an introduction to the topic by facilitators, then a group activity or discussion. The second half of meetings often related to the final project, as participants shared progress and resources, provided feedback to each other, etc.

CONTENT: Content was chosen in agreement with participants during LCs and included things like practitioner-focused short readings and ways to improve classroom learning for students through the use of metacognition activities or other content relevant to the LC.

FACILITATION: Led ideally by 2 staff or faculty members with expertise in STEM instructional practice and education. Facilitators led discussions and developed a guide including detailed meeting agendas, notes, and reflections that contributed to program assessment.

DELIVERABLES: Faculty chose an individual or collaborative final project that was completed by the end of semester (examples include White Paper or implementation of certain teaching method and reflection of how it worked in the classroom).

ASSESSMENT: Participants completed a post-survey about their experience. Faculty also annually completed instruments designed to measure instructional practices and the climate for instructional effectiveness. Facilitator written reflections also provided information about the effectiveness of LCs.

COMPENSATION AND RECOGNITION: Participation was voluntary; faculty who attended most meetings and completed the final project received a letter or acknowledgement that was also sent to their department chair. Facilitators received a stipend of \$1,000.

Additional Resources

Instructional Practices, Climate, and Social Networks. <https://wmich.edu/changeresearch/projects/develop-instruments> (Includes survey instruments used by CU Boulder CSL to measure instructional practices and the climate for instructional improvement in STEM disciplines)

TRESTLE Scholar Learning Communities at CU Boulder. <https://www.colorado.edu/csl/trestle-o> (Includes facilitators' reflections and participants' final projects for each LC)

TRESTLE Network. <https://trestlenetwork.ku.edu/> (Includes information about the multi-institutional grant, participating institutions, events, and resources)

This project is funded from the Improving Undergraduate STEM Education program within the Department of Undergraduate Education of the National Science Foundation, under Grant No. NSF DUE-1914784.

Visit *The Delphi Project on the Changing Faculty and Student Success* for more case studies of professional development that is accessible and welcoming of adjuncts and non-tenure-track faculty and a wide range of resources and toolkits to better support faculty off the tenure track at: pullias.usc.edu/delphi.

