Holistic STEM Faculty Development: A National Research Agenda to Promote Improved Research, Teaching, Service, and Leadership Through Evidence-Based Engagement

Shannon Stefl, Sandra Linder, Cindy Lee, and Karen High

Contact authors: stemfacdev@clemson.edu

Symboizes holistic STEM faculty development, with the four areas of teaching, research, service, and leadership coming together and the arrows point outward to show growth.

**Research Agenda**

**Our workshop was designed to determine overall goals and pathways for achieving said goals for research in Holistic STEM FD. The Holistic STEM FD Collaboratory identified seven overarching outcomes for research in Holistic STEM FD:**

1. Technical/Instrument Development for STEM FD
2. Impact on Students
3. Generalizable Models of Holistic STEM FD
4. Impact on Faculty
5. Equity
6. Cultural and Community Context
7. Institutional Policy and Context

To move the needle on these outcomes, the STEM Collaboratory at Clemson University used data emerging from the two-day workshop, ongoing online platform, returning subgroups from the formal working group, and member checks to establish four potential categories of research that make up an emergent agenda for research for holistic STEM FD (see table on right)

**Future Plans**

- Finalize the research agenda
- Seek further community feedback
- Disseminate the agenda through the website, professional societies, publications

**Acknowledgements**

We wish to gratefully acknowledge the efforts of Drs. Faiza Jamil and Cindy Roper

---

**Project Evaluation**

Visit the website [https://www.clemson.edu/ese/stemfacdev/](https://www.clemson.edu/ese/stemfacdev/) for the project team and an external evaluator (Cindy Roper). She was brought on early in the project conceptualization phase to ensure activities aligned with project goals. Specific evaluation and observation occurred at the following stages:

- Participant application and selection
- Pre-workshop communication by participants and event planning
- Workshop event implementation
- Post workshop participant satisfaction and research agenda dissemination

---

**Project Description**

**Motivation**

Expectations for faculty members in the 21st century are high: Early career STEM faculty are expected to establish a sustainable research trajectory, a teaching practice, and a leadership role all while pursuing tenure success. Many colleges and universities have established faculty development programs, but there remains a deficiency in holistic professional support that integrates these disparate professional activities and aligns them with desired individual and institutional goals, especially for faculty in STEM.

**Purpose**

This project was a workshop designed to bring together multiple stakeholders in academia, government, and industry to begin to establish a research agenda for holistic STEM faculty development.

**Event Description**

This workshop was held February 17-18, 2017, with 54 participants from a variety of disciplines. Attendees contributed to discussions centered around three organizing threads. These discussions served as the basis for development of the research agenda.

---

**How this Project Increases Impact**

**Community Building**

The workshop engaged multiple perspectives by including a spectrum of communities engaged in research and practice. The engagement included before, during and after the workshop. Researchers and practitioners from engineering, science, and mathematics attended and continue to contribute to a wide-ranging discussion of the research questions regarding each of the aspects of holistic STEM faculty development. We continue to build this community through a STEM Faculty Development Collaboratory which now numbers over 70 members. See [https://www.clemson.edu/ese/stemfacdev/](https://www.clemson.edu/ese/stemfacdev/).

**Research Agenda**

This research agenda will address the complexities of faculty life in the 21st century that must be understood and supported in the faculty development efforts. Effective teaching and learning of engineering and more broadly STEM can be enhanced through holistic faculty development for those engaged in higher education.

---

**Participant Disciplines**

- Mathematics
- Physics
- Chemistry
- Biology
- Environmental Science
- Sociology
- Psychology
- Political Science
- Business
- Economics

---

**This work is supported by the National Science Foundation under Grant No. EEC-1638888.**