



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.

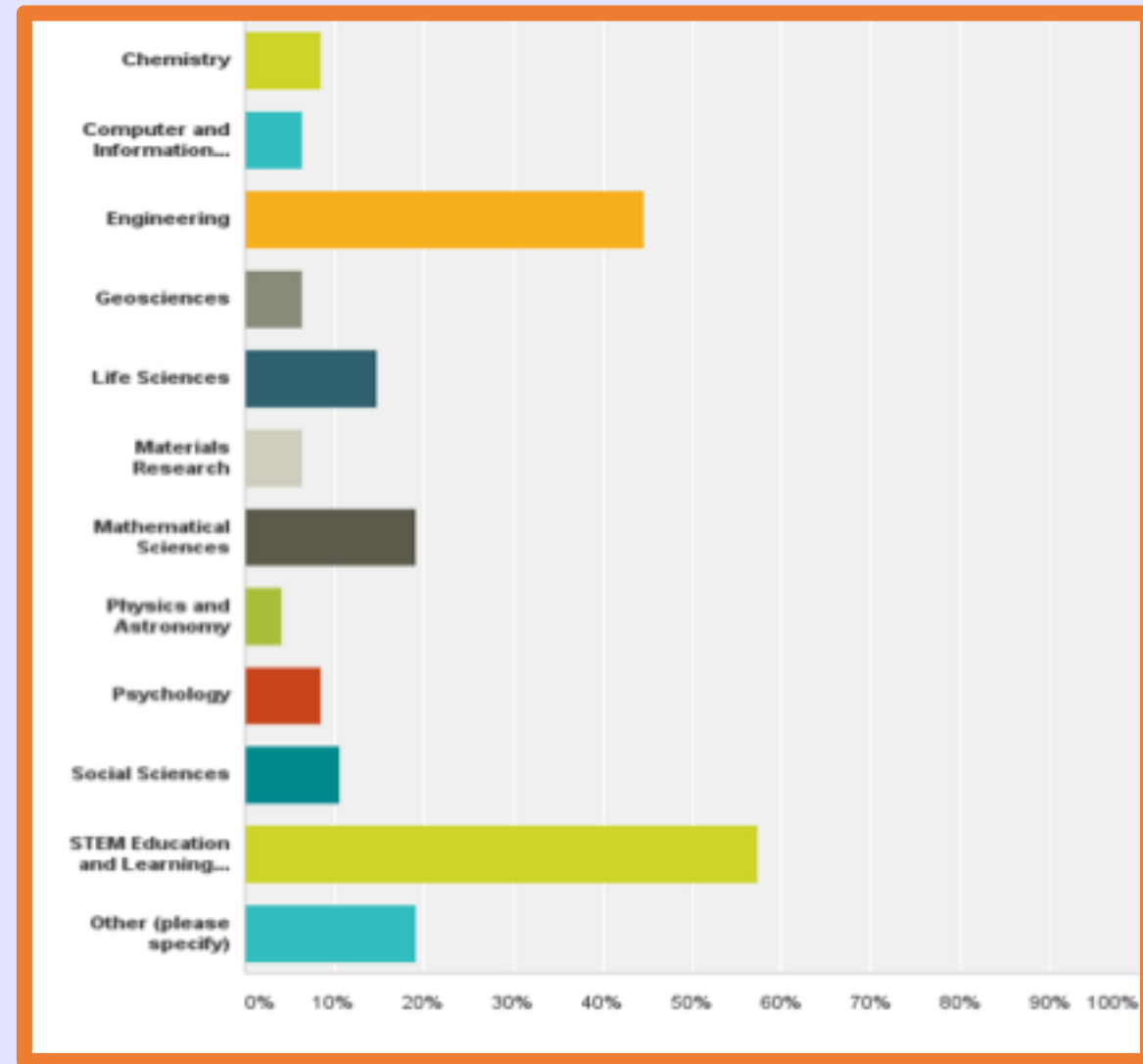
Purpose

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.

Participant Disciplines



Symbolizes holistic STEM faculty development, with the four areas of **teaching, research, service, and leadership** coming together and the arrows point outwards 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. Metrics/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 of research for holistic STEM FD (see table on right)

Category	Themes
Cultural and Contextual considerations	<ul style="list-style-type: none">Importance of ContextInstitutional ValueExternal ForcesWho's ResponsibleAddressing bias
Processes of Conducting STEM FD	<ul style="list-style-type: none">DeliveryInnovation
Assessment of Models	<ul style="list-style-type: none">Formative Assessment (Micro-inform the model/feasibility)Summative Assessment (Meso-results of the model)Systematic Assessment (Macro/Global- overall change/sustainability)Implementing Assessment
Who Are the Learners?	<ul style="list-style-type: none">Self-Regulatory DevelopmentMotivationIdentityStudent OutcomesAligning Personal and Institutional GoalsAligning Goals Across Academia

THREAD ONE - INPUTS

This thread focused on topics related to the characteristics of faculty members and institutions that serve as barriers or supports to the adoption and implementation of holistic STEM faculty development programs.

THREAD TWO - MECHANISMS/PROCESSES

This thread focused on topics related to the actual implementation of STEM faculty development and we consider the potential models or structures of STEM faculty development that are currently in place or conceptualized in theory

THREAD THREE - OUTPUTS

This thread focused on how to best understand the influence of STEM faculty development on identity in relation to faculty development, and how faculty development influences overall faculty wellbeing, career satisfaction, work-life balance, etc.

Project Evaluation (available on website <https://www.clemson.edu/ese/stemfacdev/>)

The project team hired 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 Products (available on website <https://www.clemson.edu/ese/stemfacdev/>)

- D. Lee, S. Stefl, S. Linder, C. Lee, F. Jamil, and K. High, "How Many Hats Do You Wear: Building Research for STEM Faculty Development Workshop," *Proceedings of the American Society for Engineering Education Conference*, 2017.
- S. Stefl, C. Lee, S. Linder and K. High, "Special Session: STEM Faculty Development Research Agenda," *Proceedings of the Foundations of Education Conference*, 2017.
- C. Lee, K. High, S. Linder, and S. Stefl, in review. "Holistic STEM Faculty Development," *Proceedings of the National Association for Research in Science Teaching Conference*, 2018.
- D. Alston, S. Linder, C. Lee, and K. High, in review 2017. Towards an understanding of the need for holistic STEM faculty development: A systematic literature review. *Journal of Higher Education*.
- Proceedings from Workshop (including evaluation report)
- Research Agenda
- Annotated bibliography of articles related to STEM faculty development

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

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/>.

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.

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