

EMPOWERS: Advancing Holistic Graduate Mentorship and Systemic Change in STEM Education

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IGE EMPOWERS: Advancing Holistic Graduate Mentorship and Systemic Change in STEM Education

Abstract

The Evaluating Mentoring Practices for Optimal Work-life balance in Education and Research in STEM graduate studies (EMPOWERS) program was developed in response to the Innovations in Graduate Education (IGE) Track 2: Systemic Interventions and Policies call. Founded as a part of Clemson University's Center for Transformational Mentorship (CTM) and in collaboration with the Grad 360° program, EMPOWERS is a four-year, multi-dimensional mentor training initiative that aims to enhance the bilateral relationship between graduate students and their faculty advisors for improved graduate student outcomes, such as retention rates, graduation rates, and postgraduate career placement. This paper summarizes the efforts, impacts, and lessons learned from the first year of the EMPOWERS program. In its first year, the program has impacted more than 200 faculty and graduate students at Clemson University and developed 14 new training modules and sessions for participants. Evaluation and research results demonstrate the positive reception of the program, particularly in its use of case studies and small-group discussions. In the coming years, EMPOWERS will focus on incorporating mentoring training into institutional policies and scaling the program nationally.

Introduction

Graduate students are essential pillars in developing a strong, intellectually informed workforce. However, recent studies have noted that graduate students are defecting at an alarming rate¹⁻³. One suggested reason for this change is ineffective mentoring practices⁴⁻⁷. Historically, mentoring has focused on a unidirectional relationship, defined as a top-down approach where the mentor provides information to the mentee without reciprocity⁸. Instead, modern literature emphasizes the importance of autonomy, relational practice, and active engagement from both parties in the mentoring relationship⁹⁻¹¹. This view of mentorship has been coined as holistic mentorship. Defined as “a professional, working alliance in which individuals work together over time to support the personal and professional growth, development, and success of the relational partners through the provision of career and psychosocial support,” this definition describes the bidirectional nature of mentorship, which encompasses professional as well as psychosocial support^{12,13}.

The movement towards holistic mentoring is extremely timely and necessary in graduate education. Holistic mentoring approaches can support students' sense of mattering and belonging, which are linked to improvements in mental health and well-being¹⁴. For students from diverse

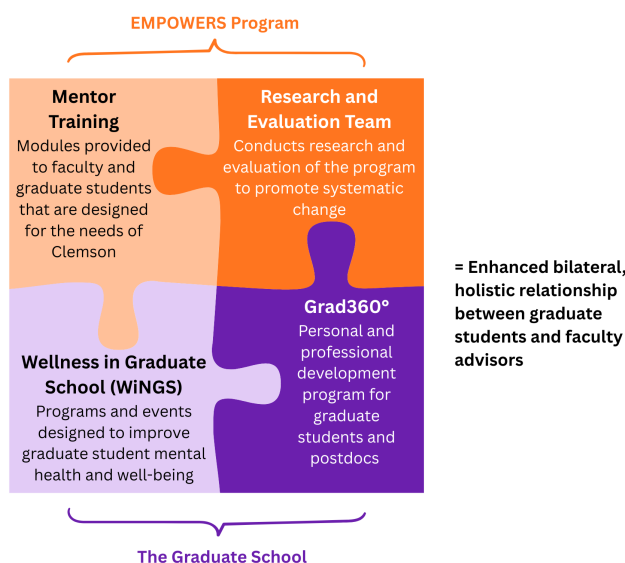
backgrounds, holistic mentoring is crucial, offering distinct benefits to both the mentee and mentor through increased awareness of and sensitivity to individual differences and needs.¹⁵ Culturally competent mentoring (a component of holistic mentoring) also involves awareness of one's own potential implicit or explicit biases, recognition of the diversity of experiences, and how these experiences inform relationships and engagement in school. Students must be able to explore, reflect, and learn in a culturally sensitive, safe, and respectful manner with their mentor, thereby promoting inclusion within their department, institution, and discipline^{8,16}. Beyond psychosocial support, a holistic mentoring approach can also provide higher accessibility to career planning and development. Effective mentoring from a faculty member has been shown to increase the research self-efficacy of graduate students, supporting them as they pursue their careers¹⁷. When graduate students increase their own mentoring self-efficacy through mentor training, they engage in behaviors that enhance their professional development as future advisors or managers¹⁸. This paper outlines a new initiative at Clemson University, termed EMPOWERS (Evaluating Mentoring Practices for Optimal Work-life balance in Education and Research in STEM graduate studies) which utilizes the concept of holistic mentorship through its mentorship training for faculty and graduate students.

Program Background

Clemson University is a Carnegie R1-classified institution, which measures its success through research productivity while prioritizing the student experience¹⁹. Specifically, the Clemson University Graduate School promotes superior research and scholarship while providing the highest levels of education and training for graduate students pursuing careers in academia, government, the nonprofit sector, or business and industry.

Clemson University Landscape

The Graduate School coordinates University efforts in graduate education. It builds the graduate faculty and student community by providing programming, resources, and support, including professional and personal development workshops via a program termed GRAD 360°.²⁰



Moreover, GRAD 360° offers comprehensive resources designed to educate and develop critical skills in students who will become professionals and leaders in a global arena. GRAD 360° offers trainees a structured way to create and track proficiencies in nine focus areas (career development and exploration; personal health, wellness, and financial literacy; research and innovation; professionalism and ethics; leadership and management; teamwork and collaboration;

Figure 1: Intersecting components of the EMPOWERS program.

teaching and learning; oral, written, and intercultural communication; and social and global responsibility). In 2022, a new program, termed the Center for Transformational Mentorship (CTM), was developed as a subset of GRAD 360. The CTM was developed as a method of training graduate students in effective, evidence-based mentoring practices (Figure 1). Initially developed using trainings developed by the Center for the Improvement of Mentored Experience in Research (CIMER)²¹, the CTM trained both faculty mentors and graduate student mentees (or mentors of undergraduate students) while simultaneously providing support for training grants, consulting to departments, and affinity group support for underrepresented minorities (international students, first-generation scholars, and scholars of color).

Evaluating Mentoring Practices for Optimal Work-life balance in Education and Research in STEM graduate studies (EMPOWERS)

Founded as part of Clemson University's Center for Transformational Mentorship (CTM), EMPOWERS is a multidimensional mentor training initiative that aims to enhance the bilateral relationship between graduate students and their faculty advisors. EMPOWERS is an NSF, IGE-funded program focused on improving graduate student outcomes, such as retention rates, graduation rates, and postgraduate career placement. Moreover, the EMPOWERS initiative focuses on the programmatic development of interactive, holistic mentor training modules for faculty and graduate students at Clemson University, emphasizing graduate student wellbeing, inclusion, and professional development, and promoting systemic change at the department, college, and University levels. Within the scope of its focus, the EMPOWERS project has two goals:

Goal 1: Promote holistic mentorship, training, mental health and well-being, inclusion, and career and professional development.

Goal 2: Affect systemic change at the department, interdepartmental/college, and University levels through capacity building and policy development related to holistic mentoring.

First Year Analysis and Impacts

Awarded in the Fall of 2024, the first year of the EMPOWERS program focused on adding to the catalog of previously developed holistic mentor training modules while developing and deploying evaluation and research tools as a baseline to track progress throughout the project.

Module Development and Deployment Before the deployment of the EMPOWERS program, the CTM program hosted six CIMER modules for graduate students and seven for faculty. A primary goal of EMPOWER's start year was to develop in-house training modules, and increase the total number of offerings. As of the Fall of 2025, nine new mentor training modules have been developed for graduate students, and five have been developed for faculty. With the development of these new modules, graduate students have a total of 15 modules available, and faculty now have a total of 13 modules (listed in Table 1). A total of 76 faculty and 151 graduate students participated in at least one session during this start year. Of these sessions, the most highly attended were "Aligning Expectations" ($n = 80$ for graduate students and $n = 61$ for faculty) and "Maintaining Effective Communication" ($n = 75$ for graduate students and $n = 38$ for faculty). However, attendance for these modules may be skewed due to EMPOWERS' incentive system:

the use of mentorship badges.

As incentives for participating in multiple trainings, graduate students and faculty can earn badges to recognize their mentoring expertise. To receive a badge, faculty and graduate students are required to first participate in the Aligning Expectations and Maintaining Effective Communication modules (hence the attendance skew). To date, approximately 30% of all graduate student participants and 63% of faculty participants have received at least one badge.

Table 1: Currently offered faculty and graduate student modules

Faculty Modules	Graduate Student Modules
Aligning Expectations	Aligning Expectations
Maintaining Effective Communication	Maintaining Effective Communication
Assessing Understanding	Assessing Understanding
Establishing a Practice of Inclusion	Establishing a Practice of Inclusion
Promoting Professional Development	Promoting Professional Development
Promoting Independence and Research	Promoting Independence and Research
Self-Efficacy	Self-Efficacy
Fostering Work-Life Integration	Fostering Work-Life Integration
Capstone: Building Your Mentoring Philosophy	Capstone: Building Your Mentoring Philosophy
Mentoring for Research to Practice Translation	Mentoring for Research to Practice Translation
Developing Mentoring Plans/IDPs	
	How to Communicate Effectively with Your Advisor
Mentoring for Research Skills Development	Mentoring for Research Skills Development
Mentoring for Responsible Conduct of Research (RCR/RECR)	Mentoring for Responsible Conduct of Research (RCR/RECR)
Mentoring and Advising the Online Student	Mentoring and Advising the Online Student

Evaluation and Research Data

As of Fall 2025, we have collected and synthesized preliminary data from multiple instruments to research and evaluate the EMPOWERS program, including (1) pre- and post-graduate student well-being surveys, (2) a graduate student evaluation survey, (3) a faculty evaluation survey, and (4) follow-up interviews with EMPOWERS graduate student participants regarding their mentoring relationship self-efficacy.

Evaluation surveys were distributed to faculty and graduate students following their participation in any EMPOWERS-delivered session. The data from these evaluation surveys were used to gain a better understanding of participant perceptions of modules, session facilitation, the usefulness of the training, and methods of improvement. Our evaluation surveys from graduate students ($n = 82$) showed the average rating for all sessions as $\bar{x} = 4.39$ (where 1 = negative sentiment and 5 = positive sentiment). Feedback from graduate students across sessions positively highlighted the integration of case studies into the training. Graduate students also recommended even more

interactivity and discussions within sessions as well as improved logistics for obtaining accessing the resources used during sessions. Feedback from faculty ($n = 60$) revealed an average rating for all sessions $\bar{x} = 4.36$. Like graduate students, faculty appreciated the use of case studies and discussions throughout the sessions. Methods for improvement in faculty sessions centered on improving technical issues during sessions and increasing session length.

Wellbeing pre-surveys ($n = 48$) were distributed to graduate student participants via Qualtrics before they participated in EMPOWERS mentor training sessions. Post-surveys were distributed at the end of the Spring semester ($n = 11$). Both surveys collected Likert-scale quantitative data as well as qualitative data from open-ended questions. Despite our team's strong efforts, we were unable to obtain sufficient data for meaningful results from the well-being surveys due to sampling limitations. All well-being survey respondents were also asked if they would like to participate in a follow-up interview focused on graduate student mentoring self-efficacy and how the EMPOWERS program impacted participants' mentor-mentee interactions. Interviews on mentoring self-efficacy were completed in the fall of 2025. Results from these interviews will be presented in our research paper presented in the ERM division (anonymized for review). Evaluation and research efforts are ongoing and will continue throughout the remainder of the grant.

Lessons Learned and Future Directions

Evaluation and research results from the first year of EMPOWERS suggest that a greater emphasis is needed on hands-on, timely sessions for graduate students and faculty. Resources for modules are also being rethought for ease of access for participants. We plan to implement at least two new modules in 2026, including one titled "Mentoring Graduate Students Through Mental Health Struggles", based on participant and advisory board feedback.

Based on feedback from the internal team, training participants, and our advisory board, we have revised our evaluation collection and reporting procedures as well as our well-being research survey. We plan to automate the results of our evaluation surveys for monthly internal review with our team. Findings will be integrated into semesterly module revisions. Our well-being survey has been condensed and is now used primarily as a selection survey for future self-efficacy and well-being interview data collection (beginning Spring 2026).

Broadly, the EMPOWERS team plans to employ new marketing campaigns, targeting a broader diversity of graduate students and faculty participants. Future years will focus on broader institutionalization of holistic mentor training, with the goal of adding mentor training as a requirement for new graduate students and as a component of the tenure review process for faculty. Some modules will also be moved to an asynchronous platform that will be broadly available. Eventually, the EMPOWERS program aims to scale nationally, providing a model that other institutions can use for their internal mentorship training.

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