Mentoring to Build the NSF ATE Community

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The Mentor Up Program, funded by the National Science Foundation (NSF) Advanced Technological Education (ATE) program through Grant #2032835, supports a mentoring program to guide prospective principal investigators in crafting and submitting a proposal to the NSF ATE program. This project aligns with the NSF ATE program objective to provide leadership opportunities for faculty at two-year institutions and also supports the national priority of educating the skilled technical workforce for the industries that keep the United States globally competitive.

The key outcome of Mentor Up is an increase in the number of competitive NSF ATE proposals submitted by community college faculty. The Mentor Up proposal writing component and mentoring by experienced principal investigators increases the knowledge and skills of community college STEM faculty at institutions with minimal grant activity, thereby strengthening the personal and institutional ability to pursue other proposal-based projects. Participants learn strategies for institutional investment in pursuit of NSF ATE program grant funding and increase project team expertise through a series of post-workshop webinars.

Mentor Up targets a diverse group of urban, suburban, and rural institutions and provide opportunities for participation of faculty and students who are typically underrepresented in technician programs, such as minority populations and women. The Mentor Up leadership team t seeks to imbue lessons learned from the previous three workshops and mentoring programs to increase the success of each cohort. The leadership team provides support to mentee faculty for up to two years in an effort to give them the best chance to submit a successful proposal. In the 2021 ATE submission, 14 of 16 colleges submitted proposals.

The goal of Mentor Up is to help participants address many of challenges faced by community college faculty in preparing and submitting NSF grant proposals and that the NSF ATE program will experience growth in community college participation. Program participants will serve as change agents for their institutions with the innovative ideas and teaching pedagogies developed in their mentored projects. For community colleges awarded NSF ATE grants, this project will result in improved student access to education and acquisition of skills needed to enter the workforce as STEM graduates whose contributions will advance the nation's economic goals for meeting emerging workforce needs.

Almost half (45%) of U.S. undergraduate students attended a two-year college. However, even after years of growth, barriers remain for students pursuing degrees in STEM fields. More than two-thirds intending to earn a STEM associate's degree fail to do so. Students enrolled in two-year colleges are more likely than 4-year college students to be economically disadvantaged, supporting dependents, and to come from groups historically underrepresented in the STEM disciplines. Resources that can address barriers encountered by two-year college students include the NSF ATE program, which supports development of two-year degrees that lead to jobs in high-technology fields. However, two-year colleges often lack the knowledge and resources to compete for program grants.

In the project's first year, teams were recruited from 16 community and technical colleges, with the team members including two technician-education faculty from the institution, together with

grant writers, administrators, or other key contributors from the institutions. Specific activities included virtual mentoring and webinars as well as a virtual 2.5-day workshop where two-year faculty who are teaching technician education learned the strategies and NSF requirements for writing and submitting competitive proposals.

Prior to the virtual workshop, teams were provided with questions to help them further develop the idea for their proposals and to help them identify personnel and resources at their institutions that will be needed for the proposal submissions. Once the questions were answered, teams met with their mentors to discuss answers and any additional questions that arose. The 2021 virtual workshop agenda was led by experienced NSF ATE PIs from various technology disciplines. Topics covered during the workshop included components of a NSF ATE proposal; results of prior support; rationale; goals, objectives, activities, and deliverables; one-page summaries; the review process; mock panels; timelines; management plans; budgets and budget justifications; elevator speeches; evaluation plans; sustainability plans; dissemination plans; Fastlane; and resources such as ATE Central and Mentor-Connect. Participants were given assignments each night such as preparing for the mock panel reviews and preparing elevator speeches for their proposals. The two faculty participants from each team were provided stipends for their participation in the workshop. They were also provided an additional stipend for submitting a proposal to the NSF by the proposal deadline in October. Participants did complete a survey pre and post surveys for the workshop. Following the workshop, mentoring continued through the submission of the proposals and for teams who received questions following proposal reviews. Webinars on the topics of Fastlane, Forms, and Timetables; Evaluation; and Budget were also offered to participants.

A Post-Workshop survey was developed using the workshop survey instrument created for the prior mentoring projects and was administered immediately after the workshop to collect faculty feedback on four different aspects of the workshop: Participant Background and Attitude, Pre-workshop Preparation, Workshop Content (materials, presentations and other activities), and Workshop Outcomes. Participants were asked to rate (from 1 to 5) various aspects of the workshop. According to the project's external evaluator, measures show increased confidence among all the participants in their knowledge and skills to prepare and submit a grant proposal. The leadership team clearly had a quality structure thought through but was willing to adapt to participants' needs. The specific descriptive ratings that correspond to the numeric ratings for each question are shown in the table.

	Participants reporting 4 or 5 (5 being the highest) BEFORE the workshop (25 responses)	Participants reporting 4 or 5 (5 being the highest) AFTER the workshop (29 responses)
I feel confident in managing the NSF submission process (Fastlane, grants.gov, research.gov)	Not asked	71%

I feel confident understanding the tasks that need to be accomplished prior to submission day.	43%	88%
I feel confident in my ability to write a quality rationale for a proposal.	Not asked	82%
I feel confident in my ability to write goals, objectives and deliverables for a successful proposal.	39%	82%
I feel confident in my ability to outline the activities to accomplish the goals and objectives.	46%	89%
I feel confident in my ability to write a time table for a successful proposal (with appropriate formatting, etc).	Not asked	89%
I feel confident in my ability to write a management plan for a successful proposal.	29%	82%
I feel confident in my ability to write a complete and correct budget for a successful proposal.	21%	71%
I feel confident in my understanding of indirect rates and their impact on the budget in a successful proposal.	Not asked	64%
I feel confident that I understand what reviewers are looking for in assessing the intellectual merit of a proposal.	Not asked	86%
I feel confident that I understand what reviewers are looking for in assessing the broader impacts of a proposal.	Not asked	85%
I feel confident that I can prepare a successful overview for a proposal.	Not asked	92%
I feel confident that I understand what Is needed for sustainability and dissemination in a successful proposal	Not asked	74%
I feel confident that I understand what is required in terms of IRB (Institutional	Not asked	68%

Research Board) approval for a successful proposal.		

During the 2021 cohort, fourteen out of sixteen teams submitted proposals to the NSF ATE program. To date, ten of the proposals received questions or were awarded. The project team remains committed to continuous project evaluation and quality control and the model evolves with feedback. For 2022, thirteen teams were recruited to participate in Mentor Up including the virtual 2.5-day workshop.