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Growing BPE Efforts: Lessons Learned from a College-Wide Seed Grant Program

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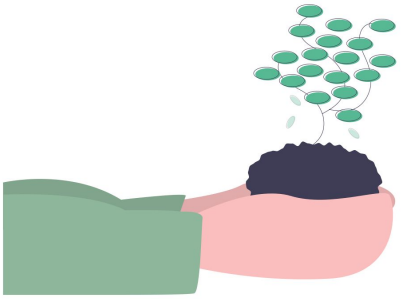
Growing Broadening Participation in Engineering Efforts: Lessons Learned from a College-Wide Seed Grant Program



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Virginia Polytechnic Institute and State University

Motivation: Creating a Learning Organization

Our seed grants program contributes to both conditions of a learning organization:

1. New ideas are **given support** so they can be developed at our institution
2. These ideas have led to changes; **new programs implemented and recommendations made for new policy and practice**

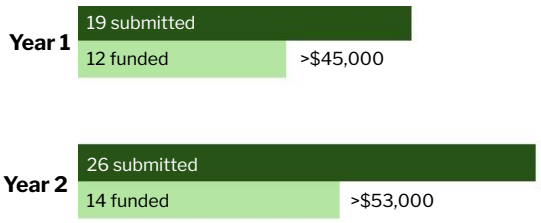
Dill, David D. "Academic accountability and university adaptation: The architecture of an academic learning organization." *Higher education* 38.2 (1999): 127-154.

- This seed grants program was part of a Center for Equity in Engineering modeled on a learning organization
- The seed grants program seeks to contribute to both of these conditions
- First, it provides financial and personnel support for ideas to be developed at the institution
- Second, projects were provided with evaluation support so that institutional leadership could see evidence of projects' impacts with the goal of institutionalizing them via policy and/or practice

Program Overview

Timeline: aligned with academic year

- Request for Proposals: first week of semester
- Proposal Deadline: mid-September
- Award Announcements: early October
- Mid-Project Report: early spring
- Poster Session: last week of semester
- Final Report: end of semester

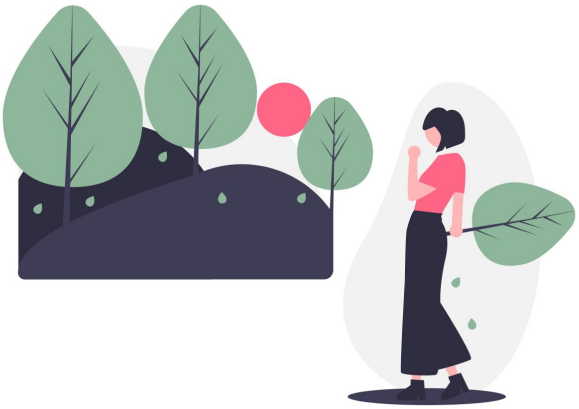


- In year 2, 3 continuing and 11 new projects were awarded

Program Design

Rationale	Program feature
• In a similar, university-wide program open to “all”, faculty largely were awardees	• Projects must be led by undergraduate students, graduate students, postdocs, or staff
• Students, staff, and postdocs may not have proposal writing experience	• Proposal template, office hours, information session
• Equity in review process	• Scoring rubric shared with template
• Sufficient budget for events and student stipends	• Budget: $3,000-$5,000
• Accountability, check if support needed	• Mid-Year report
• Awardees may not have final report writing experience; evaluation data needed for internal analysis and grant reporting	• Template for final report

Each feature of the program was in direct response to goals/ rationales for designing the program.



Pre-Program

Proposal Support

- Program info session
  - Program overview: PI eligibility, timeline, maximum budget
  - What is “Broadening Participation”?
  - Legal considerations
  - Spending guidelines
  - Proposal template
- Office hours
- 1:1 meetings with seed grant program manager

- Eight hours of office hours were provided. Prospective applicants could bring questions, come to just listen, or bring draft proposals for feedback
- The majority of awarded projects were to those who attended office hours (some of them came several times)
- Office hours were both on-campus or on Zoom, with one evening option
- For those who could not attend office hours, 1:1 meetings were offered

Proposal Template

1. **Project Lead:** Name, role (undergraduate student, graduate student, postdoc, staff), department
2. **Project Personnel:** Name, role (undergraduate student, graduate student, postdoc, staff, faculty), department for each person
3. **Brief Description and Implementation Plan:** Include a description of how the budget will be used.
    a. For continuing project proposals: How does your project build on last year's project? (Recommended: use your previous project's evaluations, outcomes, and/or impact.)
4. **Project Rationale:** How does your project support broadening participation in engineering?
5. **Project Audience:** Faculty, Staff, Undergraduate Students, Graduate Students, Community Partners, etc.
6. **Project Category:** E.g., improved support of graduate or undergraduate education, departmental culture, understanding areas for improved student support, mentoring practices, and student recruitment practices
7. **Research Question(s):** What question(s) do you seek to answer with this project?
8. **Metrics For Evaluation:** How will you evaluate your project and answer your research question(s) (e.g., survey, interviews, number of participants)?
9. **Project Outcomes and Impact:** What are you hoping to achieve with the completion of your project? How will you share the impact of your project? Who will you share it with?

- This slide and the following slide show the required template for proposals
- The rubric, which is based on this template, is available in the Additional Materials at the end of this presentation

Proposal Template

Appendix (if relevant)

1. Letter of support if partnering with other institutions (e.g., K-12 schools, another university)
2. If your project involves research:
    a. Please indicate who will be the Principal Investigator (e.g., faculty member or research staff) for the Institutional Review Board (IRB)
    b. Please include a draft list of interview or survey questions

Proposal Template: Budget

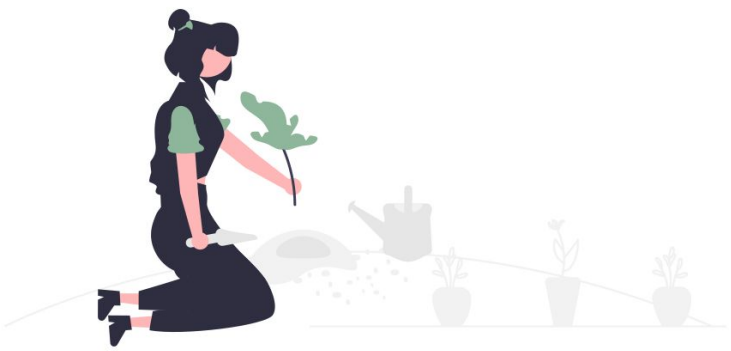
Item	Cost per Item	Number of Items	Total
Item 1	$		$
Item 2	$		$
Insert more rows as needed	$		$
TOTAL			$sum of rows above

- The proposal template also included a template for the budget
- This enabled reviewers and staff to assess the feasibility of the project within the given budget and examine the necessity and allowability (within the funder's spending rules) of proposed purchases

Proposal Review Process

- Scoring rubric is shared at the same time as the request for proposals
- Rubric categories
  - Description & Implementation Plan
  - Budget Justification
  - Project Rationale
  - Metrics for Evaluation
  - Project Outcomes and Impact
- Each proposal is read by two reviewers
- The program manager compiles all of the scores and makes the final award decisions in collaboration with another member of the center that runs the seed grant program

- Please see the Additional Materials for full rubric
- The rubric was made available at the same time as the request for proposals and proposals template to provide transparency in the review process



During the Program

Awardee Support

- Program orientation
- Mentorship for K-12-focused projects
- IRB application support
- Mentorship from program manager for research projects
- Administrative support
- Evaluation workshop
- Office hours

Meetings anytime with program manager and/or administrative associate

- Orientation is a meet-and-greet for all awardees and covers working with minors, the IRB process, and an overview of spending guidelines and administrative processes
- In year 2, all projects were required to meet with the College of Engineering's K-12 outreach coordinator at least once. All of them met with her several times
- An IRB info session was offered for those interested. The program manager also met with teams 1:1 to prepare their IRB applications
- One research project was mentored in year 1 and one in year 2
- Evaluation worksheet is at the end of this presentation and the evaluation workshop slides are available upon request. The program manager also reviewed several groups' evaluation surveys or interview protocols
- Office hours were held again at the end of the year to assist awardees with their posters and final reports

- MANY groups met with the program manager, and many of them several times

Mid-Project Report Template

1. Compare your original project timeline with how it has been going.

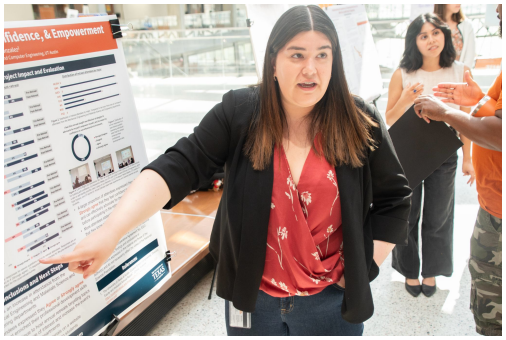
Month	Planned Activities	Actual Activities
October		
November		
December		
January		

2. Timeline for the remainder of the project

Month	Planned Activities
February	
March	
April	
May	

3. How has your project been going so far? What is working well? What has been an unexpected difficulty? If you have hosted an event, how did it go?
4. What support do you need to successfully complete your project?

Goal: provide milestone for continuous progress and a way to see if any groups needed help



End of the Program

Poster Session

- All projects were required to present a poster at and end-of-program poster session
- A poster template was provided

Final Report Template

Introduction

1. Brief project overview
   a. What were your original research questions?
   b. What did you do?
   c. Did this differ from your original proposal? In what way(s), and why?
2. Did you develop new ideas that did not previously exist at UT Austin? If so, describe them and how they build on or augment broadening participation in engineering at UT Austin.

Project Evaluation (You may include tables, graphs, or other figures here if you wish. They are encouraged but not required).

3. What were your evaluation questions?
4. What output data did you collect?
5. Did you set a goal related to your outputs? (Yes/No)
6. What was your goal? (If yes to #5)
7. Did you meet the goal? (Yes/No)
8. What outcome data did you collect?
9. Did you set a goal related to your outcome(s)? (Yes/No)
10. What was your goal? (if yes to #9)
11. Did you meet the goal? (Yes/No)

Project Impacts

12. Do you have any plans to continue your project in the future?
    a. If not, why not?
    b. If so, what support would you benefit from in the future? (We do not currently have concrete plans for providing continuing support but are asking so we know what connections we can help make.)
13. Do you plan to, or have you, published about this project anywhere?
14. What impact did participating in the seed grants program have on you, personally, or other members of your team?
15. Based on the outcomes of your project, do you have any ideas for changes that might be made to how UT operates or new programs that should be institutionalized?
16. What recommendations do you have for the second year of the seed grants program (that you did not already mention on your mid-project report)?

- Final reports were needed for our grant evaluation
- Projects needed evaluation for the dean to see if there were efforts we wanted to institutionalize

Program Outcomes

Year 1 Outcomes: Impacts on Students

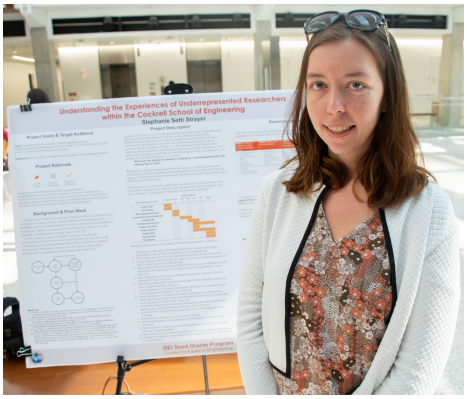
- Professional development for students, postdocs, and staff
- Two published conference papers
- One journal manuscript in progress
- One proposal submitted with preliminary data
- Increased interest in engineering education or equity work
- Department relationships with local minority-serving institutions

> Participation in this project gave me my first real taste of what academia could be like. As the 'PI' of this project I learned, in a hands-on way, how to articulate my ideas via proposal and how to manage my own research program. This program was an incredible opportunity to grow as a researcher and is a real hallmark of my graduate education."
>
> Graduate student awardee

- Professional development
  - Program management: creation, logistical challenges, timeline constraints
  - Principal investigator skills (particularly for graduate students): writing a proposal, managing a project or research program, completing the IRB process, mentoring undergraduate students, conducting project evaluations
  - One postdoc: learned about the importance of getting interdepartmental cooperation and buy-in
  - Staff: importance of faculty buy in

Year 1 Project Highlight

- “Understanding the Experiences of Underrepresented Researchers in CSE”
- Staff member received mentorship to complete her first engineering education research project
- Outcomes
  - Future ASEE conference paper
  - Actionable recommendations for Associate Deans of Research & BPE



Year 1 Outcomes: Impacts on College of Engineering

- Seven projects impacted 147 people
- Two recommendation reports
  - One for College of Engineering
  - One for a single department
- Two ASEE papers
- Undergraduate mentoring program
  - Increased sense of belonging in department
  - Increased “identity as an engineer”
- Graduate student retreat
  - Higher ability to self-advocate
  - Increase in knowledge of strategies for conflict management & self-doubt, resources available at institution, meaning of self-empowerment, methods for self-empowerment
  - Increased feelings that the institution cares about their needs

- Impacts from other projects
  - Improved satisfaction as a graduate teaching assistant
  - Increase in sense of belonging
  - Likelihood to take another professional development course at the institution
  - Increased interest in attending graduate school

Program Iteration

Year 1 Lessons Learned		Year 2 Changes
• Awardees have little experience in program evaluation	→	• Evaluation workshop and resources
• Unforeseen challenges working with external collaborators can lead to project delays	→	• Require letter of support in proposal for projects with external collaborators
• Funding agency spending guidelines didn't always align with awardees' spending priorities	→	• Clarified spending requirements in the Request for Proposals
• Many successful proposals were from those who attended office hours	→	• Office hours expanded

- Example of spending: awardees wanted to buy food for events (e.g., pizza for a lunchtime talk), which the funding agency has strict guidelines for
- Additional lesson learned: Reviewers had valuable feedback for applicants. For awarded projects, reviewers' comments offered advice or ideas; for unawarded projects, they offered advice on how to improve the proposals for resubmission the following year. We shared these comments in both year 1 and year 2

Year 2 Outcomes

- 11 projects impacted 328 students; one project surveyed 160 students
- One ASEE paper
- Two abstracts submitted to other conferences
- K-12 outreach
  - Increased knowledge in becoming an engineer, familiarity with what engineers do, interest in engineering, STEM motivation
- Undergraduate students
  - First gen: improved leadership and communication skills
  - Increased feeling of being prepared for a research role,
  - SG2-4: 129 participants. 90% comp to 40% applied to research position, 40% vs 10% working in lab
- Grad students
  - Increases in TA job satisfaction and sense of belonging to community of TAs
  - Increase in ability to succeed, combat self-doubt, and pursue self-empowerment
  - Increases compared to climate survey in believing diversity is imperative to CSE success, feeling respected and valued by primary supervisor
  - Increased confidence in science communication
- Creation of career-centric vodcast library for international engineering students

Year 2 Highlights:
Two projects' efforts were institutionalized

- First-gen undergraduate student mentorship program & resources

- TA peer mentoring/ support program

- First-gen program will be supported by one department, and its resources will be added to the institution-wide first-gen student Canvas page
- Two departments have already agreed to fund the TA program, and other departments are interested

Future Recommendations

- Community-building events for awardees
- Centralized hub for communication between awardees
- Professional development: how to obtain continued funding
- Mini-projects (1 semester long)

1. Community building was requested by year 1 awardees and we added one event in year 2 but recommend more.
2. Many awardees share similarities across projects and would benefit from sharing what they've learned, especially with navigating institutional issues, planning events, and working with K-12 partners
3. This seed grants program is meant to provide funding to get ideas started, but not to support projects long-term. As such, we recommend having a workshop towards the end of the program year about how to find continued funding (e.g., avenues for funding such as departments, how to request funding)
4. Some projects did not need to be a year long, but would have benefitted from the program. In the future, we recommend a semester-long option with a smaller budget cap

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Additional Materials

Rubric

	3	2	1
Description and Implementation Plan	• The project has clearly defined goals that are specific, measurable, and relevant. • There is a clear timeline for the project, and it is achievable within the timeframe of the grant. • The timeline includes when evaluation will occur.	• Only one of the following is true: Project goals are vague and lacking specific details, are not measurable, OR are not relevant to the seed grant program. • There is a timeline but it isn't clear whether it will be achievable within the timeframe. • The timeline is vague about when evaluation will occur.	• Project goals are vague and lacking specific details, are not measurable, AND are not relevant to the seed grant program. • There is no timeline for the project. • The project is not achievable within the program timeframe. • The timeline does not include when evaluation will occur.
Budget Justification	• All items in the budget have a clear purpose and explanation. • Each line item is a reasonable price.	• Some, but not all of the items in the budget have a clear purpose and/or explanation. • Some items are not reasonable prices.	• The proposal is missing a budget. • The items in the budget are not being used appropriately to achieve the goals of the project.

Rubric

	3	2	1
Project Rationale	• There is a clear explanation of how the project promotes broadening participation in engineering. • It is clear how the project goals are related to its audience.	• Only one of the following is true: there is a clear explanation of how the project promotes broadening participation in engineering OR it is clear how the project goals are related to its audience.	• The project is not related to broadening participation in engineering. • It is unclear how the project goals are related to its audience.
Metrics for Evaluation	• The methods for evaluation are clearly defined (e.g., survey, interviews, etc.) and it is clear how it will be administered.	• There is discussion about how to how to evaluate the project, but it is missing details. OR • There are methods discussed, but other methods could be more appropriate.	• There is no plan for evaluation. • There are no specific methods mentioned for evaluation.

Rubric

	3	2	1
Project Outcomes and Impact	• The project goals will lead to specific outcomes. • The proposal clearly identifies **whom** the project will impact (e.g., undergraduate students, a specific department, etc.) AND **how** it will impact them.	• The project goals are somewhat unclear. • The proposal clearly identifies **whom** the project will impact (e.g., undergraduate students, a specific department, etc.) OR **how** it will impact them.	• The project goals will not lead to specific outcomes. • The proposal does not identify **whom** the project will impact (e.g., undergraduate students, a specific department, etc.) AND **how** it will impact them.
For Continuing Proposals Only	• The project builds upon last year's project. AND • The proposal gives a clear explanation of how last year's project informed the design of this year's project.	• The project builds upon last year's project. OR • The proposal gives a clear explanation of how last year's project informed the design of this year's project.	• The project is exactly the same as last year's project or has only minimal changes to the idea.

Proposal Letter of Support Template

Dear members of the review committee,

I, _____ (person's name) of _____ (organization) agree to work with _____ (seed grant project lead) on their project _____ (seed grant proposal title). I will participate in this project (insert description of how they will participate).

Sincerely,

Name
Organization
Email address

Evaluation Workshop Worksheet

1. Project Goal
2. Definition of Success
3. Research Questions
4. Project Impact
5. What are some evaluation questions you have?
6. What are measurable outputs? How will you measure them?
7. What are measurable outcomes? How will you measure them?

Slides for evaluation workshop available upon request.