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GSAF Final Report, May 2016
SMART Program

The SMART (Student Mentoring And Research Teams) Program is a summer program in which teams of undergraduates and graduate students work together on a research project conceived by the graduate student. The program also includes a toolkit for graduate students to learn about good mentoring practices. At this time, the toolkit is mainly contained within a spring semester course that all graduate students in the SMART program are required to enroll in. During this course, graduate mentors think about their own mentoring needs and the mentors in their own research, and read and talk about good mentorship practices. Mentors also spend time during the course thinking about what they are looking for in a mentee and interviewing mentees before the summer research program begins. Currently, the mentoring toolkit is made up mainly of the components of the course. During the summer program, mentors and mentees attend a series of workshops, work together on research for 20 hours/week for about 8 weeks, and develop a research poster to present at an end of program poster session. Both undergraduate and graduate students in the program are monetarily compensated for participation in the program. Student teams are expected to meet at least once per week about the research project.

Involved in this project are the instructors of the mentoring course, who are also the SMART program staff, the PI on the NSF grant that funds the SMART program, staff from the Center for Higher Education, and a graduate student researcher (myself). During this project we also consulted with other researchers at Berkeley who study undergraduate research.

At this point in evaluation of the SMART program, the goal of the evaluation project is to find out whether the mentors are developing mentorship competencies during the program, and which parts of the "toolkit" (course) are helpful in the development of those competencies. We are also aiming to evaluate whether undergraduate mentees are gaining research or academic skills, or increasing their plans to attending graduate school or seek out research activities in the future. To begin answering these questions, we needed to determine what mentorship competencies were for graduate students working on a mentored research project. We conducted a literature review on this topic, and looked more broadly on mentorship in STEM higher education. From the literature review we developed a list of competencies and found sample instruments that were provided in the literature. We also read literature about undergraduate research and talked with researchers at Berkeley who are working on evaluating the impacts of undergraduate research. From the literature, we developed a list of undergraduate

research competencies, as well as academic skills that might be impacted by research experience.

Toward evaluating the program for effectiveness in helping graduate students develop mentorship competencies and undergraduates develop research skills, we developed two survey instruments to be administered before the beginning of the official summer SMART program (but after the graduate course in mentoring) and at the end of the summer SMART program. Survey items were developed using the competencies developed from the literature review, the sample instruments from the literature review, and the coding of instruments from previous years of the SMART Program. Different surveys will be given to mentors and mentees in the program. The surveys will be administered online using SurveyMonkey and will be anonymous.

Pre-summer and post-summer surveys for the mentors include items that ask about confidence as a mentor for an undergraduate researcher, characteristics of an effective mentor, and confidence with certain tasks that map to the mentorship competencies. The pre-summer survey also asks about motivation for joining the program, the research project and plan for conducting the research during the summer, and solicits volunteers for observation during the program.

The Pre-summer and post-summer surveys for the mentees include items that ask about confidence as a researcher, confidence with tasks that map to research competencies, and plans for doing research or attending graduate school in the future. The pre-summer survey also includes questions about the student's expectations about the program, their experiences in research prior to the program, what they are looking for in a research mentor. The post-summer survey will also include items we can use to pair with the mentor survey to get a better assessment of mentor competencies from both the mentor and mentee perspectives.

The pre-summer instruments are attached in the appendix. Post-summer instruments will be adjusted after data from the pre-summer survey is collected and preliminary analysis is done to understand how the items functioned and what gaps there are in data collection. Both surveys also collect demographic data for respondents.

Data has not yet been collected using these surveys since the SMART program will run from June through August. Next steps in the project are to distribute the survey to SMART participants during the summer and do some preliminary analysis. We will also be doing in-depth observations of some student pairs during the program and observation of the official program events.

In the future, it would be beneficial to work on the human subjects protocol and alert subjects about the evaluation project during the application process so that their application data can be used as data during evaluation.

Reflection

During this process I learned about the amount of work that goes into creating a good assessment instrument and how the assessment instrument itself differs from evaluation. Part of this process that surprised me was the amount of time spent with the stakeholders and trying to find out what the research questions are by engaging with the stakeholders. I found this surprising because it differs from social science research; in my experience, coming up with the research question is a task taken on by a researcher or team of researchers (note: I'm not talking about design research, in which stakeholders are consulted throughout the process). In the evaluation project, the stakeholders were consulted and communicated with at almost every decision, and we spent a lot of time prior to developing instruments trying to understand what they wanted to be done and what data we could feasibly get from them toward meeting their evaluation goals.

I also learned about how much time and effort went into developing the instruments. In my own research I would develop and test assessment instruments, but I did not realize that in evaluation there is also such a focus on developing instruments based in both literature and previous research, that the evaluator may or may not have read before. Developing an evaluation instrument is truly an intensive research endeavor – and evaluating programs requires some unique skills from typical lab research like being able to break down topics you're not familiar with and find out more about them to develop an evaluation plan. After coding the responses to previous survey instruments, I realized that it could be easy to develop a survey that does not yield much useful information toward the actual evaluation question. Developing an instrument that yields useful information, however, takes time, testing, and thought.

I also learned about the importance in evaluation of the research question, similar to in other research projects. However, getting stakeholders to articulate the research question with adequate detail is a challenge. In this project, evaluating the mentorship toolkit for effectiveness might be nearly impossible until we know which mentorship competencies we are evaluating and whether or not mentors in the program are actually developing those competencies through this program.

One of the challenges I found with the project was in gaining access to data. Due to the timing of the project, the application process began before a human subjects protocol was developed. Therefore students were not informed during the application process that they would be a part of this evaluation research. This was also the case for the mentorship course all graduate students in the SMART program are enrolled in. I learned that, as in most research, the timing of data collection is important to think about so that there are not significant setbacks.

1. Welcome to the SMART Mentee Survey

The Graduate Division is interested in hearing from you about your needs and expectations for the SMART summer research mentoring program. This survey is part of an effort by the Graduate Division to understand your experience in the SMART program. You will be requested to complete another survey at the end of summer to reflect on your experience.

CONSENT FORM:

1. Procedure: You will respond to closed and open-ended questions about undergraduate research mentoring by selecting or typing answers.

2. Discomforts and risks: There are no known risks involved in completing this survey.

3. Benefits: The results of this survey are intended to benefit future undergraduate students who are going to be mentored by graduate students and faculty.

4. Duration: It will take approximately 15 minutes to complete the survey.

5. Confidentiality: The survey seeks general information about your background and research experiences. The data will be collected on a secure web server and saved separately from any personally identifiable information. Your responses will be assigned a non-recognizable identification number during analysis. Only the SMART program evaluation team (Yukiko Watanabe and Beth McBride, Center for Teaching and Learning) will have access to the original data. Findings will be disseminated in aggregate.

7. Right to ask questions: Contact Beth McBride (bethmcbride@berkeley.edu) with any questions about the survey. If you have questions about your rights as a participant, contact the UC Berkeley Committee on Protection for Human Subjects (510-642-7461, ophs@berkeley.edu).

8. Voluntary participation: Responding to this survey is voluntary. You can stop your participation at any time.

Please complete this survey by XXX

Name & Title: Rosemary? Linda & Sabrina?

Who should sign this?

1. Please indicate below whether or not you consent to participate in the survey.

- ◯ I consent
- ◯ I do not consent

2. Program expectations

2. What do you hope to learn by participating in the SMART Program? Explain in a few sentences.

3. How much independence do you expect to have while working on the SMART research project?

- ◯ I determine the design of the study based on disciplinary norms.
- ◯ I initiate research plans and the mentor provides feedback
- ◯ Mentor provides support (when needed) to enable me to engage in research tasks
- ◯ Mentor sets the research tasks and provide limited directions
- ◯ Mentor provides highly structured directions and models the tasks
- ◯ Mentor assigns day by day specific tasks
- ◯ Other (please specify)

3. Mentoring Expectations

4. Have you engaged in mentored research?

- ◯ Yes
- ◯ No

If you answered "yes," briefly describe what guidance and support you received from the mentor that helped you to improve your research skills.

5. What are some of the personal characteristics that you are looking for in a mentor?

4. Research Skills

6. What is your current confidence level as an undergraduate researcher?

◯ Not confident at all ◯ Not so confident ◯ Somewhat confident ◯ Very confident

7. To what extent are you confident in the following?

	Not confident at all	Not so confident	Somewhat confident	Very confident	N/A
Explain underlying theories and concepts (for the project)	◯	◯	◯	◯	◯
Formulate valid research questions	◯	◯	◯	◯	◯
Design a study/experiment	◯	◯	◯	◯	◯
Troubleshoot problems and refine the methodology	◯	◯	◯	◯	◯
Gather data (laboratory techniques, focus groups, database search, etc.)	◯	◯	◯	◯	◯
Analyze data	◯	◯	◯	◯	◯
Find patterns and meaning in data	◯	◯	◯	◯	◯
Write a research report	◯	◯	◯	◯	◯
Be able to use appropriate citation conventions of my field	◯	◯	◯	◯	◯
Orally present research findings	◯	◯	◯	◯	◯

8. To what extent do you agree with the following?

	Completely disagree	Somewhat disagree	Somewhat agree	Completely agree	N/A
I use time in an effective manner	◯	◯	◯	◯	◯
I am comfortable approaching faculty members for help	◯	◯	◯	◯	◯
I am comfortable approaching older students for help (graduate students, postdocs)	◯	◯	◯	◯	◯
I am aware of campus resources that support research	◯	◯	◯	◯	◯
I value others' feedback on my work	◯	◯	◯	◯	◯
I am able to incorporate feedback in my work	◯	◯	◯	◯	◯

5. Future plans and research engagement

9. Upon graduation, do you plan to...

	No	Have not decided, but **leaning towards no**.	Have not decided, but **learning towards yes**.	Yes
Apply for a graduate program (MA/MS/Phd, etc.)?	○	○	○	○
Pursue a career in research?	○	○	○	○

10. Have you engaged in on-campus and/or off-campus research opportunities before? Check all that apply.

- ☐ Taken **a research-oriented seminar** with faculty (a course in which you learned research methods or researched a topic)
- ☐ Taken an **independent study** course
- ☐ Assist faculty (or graduate students) in research **as a volunteer without course credit**
- ☐ Assisted faculty in research **as a volunteer with course credit**
- ☐ Assisted faculty (or graduate students) in research **for pay**
- ☐ Participated in the **Undergraduate Research Apprenticeship Program**
- ☐ Pursued other forms of **independent research**
- ☐ Other (Please describe.):

11. Have you sought any research fellowship or scholarship?

	Yes	No
On-campus research funds (e.g., Haas Scholars, summer undergraduate research fellowships)	○	○
External research fellowship (e.g., National Science Foundation, research internships)	○	○

6. Your Background

12. What is your ethnicity?

- [ ] Asian/Pacific Islander
- [ ] Black/African American
- [ ] Chicano/Latino
- [ ] Native American/Alaskan Native
- [ ] White/Caucasian
- [ ] International
- [ ] Decline to state
- [ ] Other (please specify)

13. With which gender do you identify?

- ◯ Female
- ◯ Male
- ◯ Other
- ◯ Decline to state

14. What is your major?

15. What year in school have you just<u>finished</u> (in May 2016)?

- ◯ 1 (freshman)
- ◯ 2 (sophomore)
- ◯ 3 (junior)
- ◯ 4 (senior)
- ◯ 5+

16. Are you a transfer student or did you start at Cal as a freshman?

- ◯ Transfer
- ◯ Freshman admit

17. Will you be working at another job besides your SMART research during summer 2016?

- ◯ Yes
- ◯ No

7. Thank you!

Thank you for participating in the survey! We look forward to meeting with you throughout the summer.

[NAME & TITLE]

1. Welcome to the SMART Mentor Survey

The Graduate Division is interested in hearing from you about your expectations for the SMART summer research mentoring program and your perceived strengths and experiences as a mentor. This survey is part of an effort by the Graduate Division to evaluate the effectiveness of the mentoring guidance tools and inform future improvements of the tools. You will be requested to complete another survey at the end of the summer.

CONSENT FORM:

1. Procedure: You will respond to closed and open-ended questions about undergraduate research mentoring by selecting or typing answers.

2. Discomforts and risks: There are no known risks involved in completing this survey.

3. Benefits: The results of this survey are intended to benefit future users of the mentoring toolkit.

4. Duration: It will take approximately 15 minutes to complete the survey.

5. Confidentiality: The survey seeks general information about your perceptions and experiences with mentoring. The data will be collected on a secure web server and saved separately from any personally identifiable information. Your responses will be assigned a non-recognizable identification number during analysis. Only the SMART program evaluation team (Yukiko Watanabe and Beth McBride, Center for Teaching and Learning) will have access to the original data. Findings will be disseminated in aggregate.

7. Right to ask questions: Contact Beth McBride (bethmcbride@berkeley.edu) with any questions about the survey. If you have questions about your rights as a participant, contact the UC Berkeley Committee on Protection for Human Subjects (510-642-7461, ophs@berkeley.edu).

8. Voluntary participation: Responding to this survey is voluntary. You can stop your participation at any time.

Please complete this survey by XXX
Name & Title: Rosemary? Linda & Sabrina?
Who should sign this?

1. Please indicate below whether or not you consent to participate in the survey.

- ◯ I consent.
- ◯ I do not consent.

2. Motivation

2. What is your motivation to join the SMART program? (Choose all that apply.)

- [ ] Gain summer financial support
- [ ] Develop effective communication skills
- [ ] Develop leadership skills
- [ ] Devote more time to research
- [ ] Become part of the graduate student mentor community
- [ ] Acquire teaching experience in undergraduate research
- [ ] Increase job prospects
- [ ] Improve the relationship with my graduate advisor by experiencing a mentor role
- [ ] Other (please specify)

3. How will your experience in the SMART program contribute to your future career?

3. About Your Research Project

4. Is the summer research project part of...

	Yes	No
a faculty-led research/grant project?	◯	◯
your dissertation research?	◯	◯

5. What is the size of your summer research project team? Besides yourself, describe the number of undergraduate students, post-docs, staff, faculty who are directly involved in the project.

6. How much independence do you expect the mentee to have by the end of the SMART research project?

- ◯ The mentee will determine the design of the study based on disciplinary norms
- ◯ The mentee will initiate research plans and I will provide feedback
- ◯ I will provide support (when needed) to enable the mentee to engage in research tasks
- ◯ I will set the research tasks and provide limited directions
- ◯ I will provide highly structured directions and model the tasks for the mentee
- ◯ I will assign daily specific tasks
- ◯ Other (please specify)

4. Your Experience as a Mentee and/or a Mentor

7. How has your advisor facilitated your academic growth? Provide specific examples of guidance and support you received that were effective.

8. Outside of the SMART program, do you have any experience mentoring undergraduate students in research?

- ◯ Yes
- ◯ No

If you answered "yes," briefly describe your role and what you gained from the experience.

9. How confident are you as a mentor of an undergraduate researcher?

- ◯ Not confident at all
- ◯ Not so confident
- ◯ Somewhat confident
- ◯ Very confident

10. What words would you use to describe your role as an undergraduate research mentor? (e.g., guide, advisor)

11. What are some personal characteristics that make a person an effective mentor?

5. Mentoring Competencies

12. To what extent are you confident in carrying out the following tasks?

	Not confident at all	Not so confident	Somewhat confident	Very confident
Guide the mentee to gain sufficient background and context of the research project	◯	◯	◯	◯
Guide the mentee to understand how the research tasks and processes contribute to the overall goals of the research project	◯	◯	◯	◯
Train mentees in research skills required for the project (e.g., database search, coding, lab techniques, etc.)	◯	◯	◯	◯
Help the mentee set goals and action plans for their research tasks	◯	◯	◯	◯
Help the mentee take increasing responsibility in managing research tasks	◯	◯	◯	◯
Help the mentee cope with challenges and setbacks in research	◯	◯	◯	◯
Assess mentee's performance and learning	◯	◯	◯	◯
Provide constructive feedback on mentee's performance and learning	◯	◯	◯	◯
Respond to the mentee’s needs with the appropriate balance of challenge and support	◯	◯	◯	◯
Introduce the mentee to your research community on campus	◯	◯	◯	◯
Introduce the mentee to your larger disciplinary culture and community	◯	◯	◯	◯
Advise the mentee about his/her academic trajectory	◯	◯	◯	◯
Maintain open and regular communication with the mentee	◯	◯	◯	◯
Build a relationship with the mentee by using active listening, empathy, and respect	◯	◯	◯	◯

13. Are there any other ways you plan to facilitate mentee's development?

6. Your Background

14. What is your ethnicity?

- [ ] Asian/Pacific Islander
- [ ] Black/African American
- [ ] Chicano/Latino
- [ ] Native American/Alaskan Native
- [ ] White/Caucasian
- [ ] International
- [ ] Decline to state
- [ ] Other (please specify)

15. With which gender do you identify?

◯ Female ◯ Male ◯ Other ◯ Decline to state

16. Which graduate program are you in?

17.

Please indicate which degree milestones that are applicable to your discipline and have completed so far.

(Check all that apply)

- [ ] Required coursework
- [ ] Master's degree
- [ ] Position papers and/or preliminary examination
- [ ] Qualifying examination
- [ ] Dissertation prospectus: written proposal
- [ ] Dissertation prospectus: oral defense
- [ ] Dissertation research: data collection
- [ ] Dissertation research: data analysis
- [ ] Dissertation research: drafting chapters
- [ ] Other (please specify):

18. What type of research do you mainly do? (Check all that apply)

- [ ] Archival
- [ ] Computational
- [ ] Lab/experimental
- [ ] Other (please explain)
- [ ] Design-based
- [ ] Textual
- [ ] Theoretical

19. Have you received other funding for summer 2016 besides the SMART fellowship?

- ( ) Yes
- ( ) No

7. Soliciting volunteers for follow-up in summer

20. The evaluation team would like to observe 3 research meetings (beginning, middle, end) you will have with your mentee. Are you willing to have an observer participate in your research meetings?

- ◯ Yes (You will be asked to provide your email address on the next page.)
- ◯ No

8. Thank you for agreeing to allow an observer in your research meetings!

21. Please provide your **email address** below for a follow-up. We will not link your email address to your responses and confidentiality and anonymity will be assured.

9. Thank you!

Thank you for participating in the survey. We look forward to meeting with you throughout the summer.

Name & Title