



EVALUATING YOUR REU PROGRAM

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Evaluation is essential for assessing progress in reaching program goals, and for identifying ways to improve your REU program.

Although program evaluations are not required per the NSF solicitation, evaluating your REU program is a good idea. Limited funds may be used for evaluation purposes. If you have results, it is a good idea to include them in your annual project report to NSF. Evaluation can also be an invigorating and rewarding way to learn about the impact of your REU program on students and mentors!

This chapter aims at demystifying the evaluation process. It describes the different types of evaluations, shares a range of tools, and provides examples and resources. Talk to your program officer about evaluating your program.

➔ What should we evaluate?

Evaluating the program's impacts on students and the achievement of REU program goals is vital in program assessment, while mid-program feedback can provide important insights that prompt change.

Achievements Through the Lens of REU Program Goals

The overall question that evaluation can help answer is whether or not the program is reaching its goals. Revisit the objectives stated in your REU proposal, and collect the necessary data on demographics and other relevant measures. For example, collecting demographic data during the application process can show the level of success in recruiting and selecting students from the target demographic group.

Program Impacts on Students

Investigate student satisfaction with programmatic elements that may have impacted the student's sense of accomplishment or belonging. These might include the:

Overall internship experience:

- » Project scope and progress
- » Mentoring and staff support
- » Sense of belonging in the cohort and lab/group
- » Handling of logistics and any issues of concern



Mentor Perspectives

Check in with the mentors at least a few times during the program. Mentors can be surveyed at the program's end to obtain an independent evaluation of the student's work and the program's impact. This gives a triangulation on the student's and staff's perspective. Topics could include:

- Frequency of interactions with the student
- Student's progress or accomplishments on the project
- Issues that may have arisen
- Preparedness for mentoring and support provided by the REU staff
- Feedback about the program

A survey example is available in this chapter's Appendix.

➔ Which tools are best for evaluating an REU program?

Different types of evaluation serve different purposes (see Appendix for a summary table). Two evaluation types are commonly used by REU site managers:

Formative evaluation:

Methods of obtaining feedback during the program that can prompt changes to the program right away and for future years.

Summative evaluation:

Measurements that reveal whether program goals have been reached.

In addition, **longitudinal**

tracking and surveying of alumni can provide further information on the program impact, on students' career pathways, as well as on any changes in student perceptions of the REU experience.

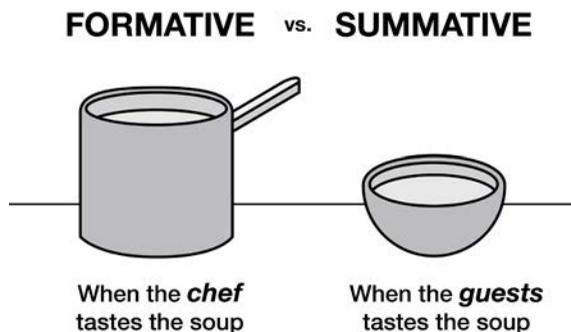


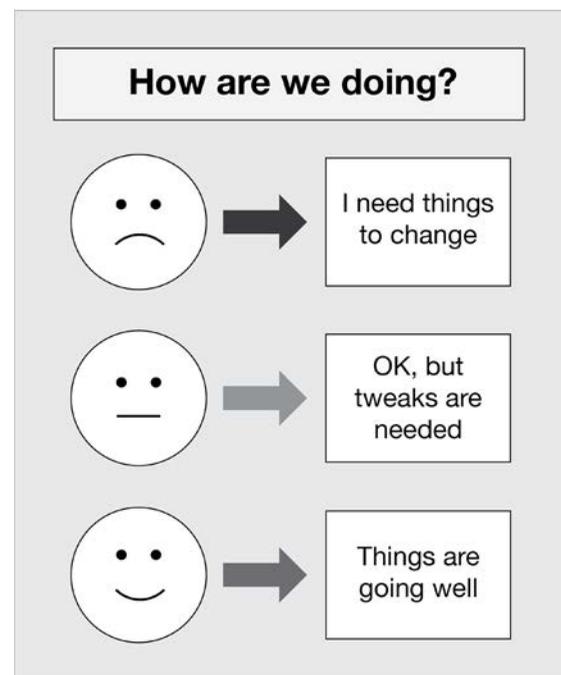
Fig. 1. There are different reasons to use different types of evaluation. Figure adapted from Willow Education (2017).



➔ **Formative Evaluation: How do we get information during the program?**

During the REU, formative evaluation data gathered from students and mentors allow you to improve the program and make mid-course changes as needed. Here are ideas on how to do this.

- » Meet regularly with the cohort to check in with students on what is working and what needs changing.
- » Conduct a mid-program or weekly survey to give students an opportunity to provide feedback anonymously.
- » Meet individually with the students near the beginning of the program to allow you to get to know them. Even a 30-minute meeting greatly helps to establish a connection and facilitates brief check-ins later in the program on what is working well and what they might need support with.
- » Have students present an update of their research and initial findings in a short white-board talk (no slides, just drawing on a board) in the early to middle part of the program. This informal presentation provides an excellent opportunity to assess the student's research progress, to provide feedback to the student, and to determine whether the project design might need to be tweaked.



Evaluation Type (& when/why collected)	Can be used to collect data on...	Sample instruments
Baseline (before REU begins; before participants are selected), used to establish a baseline to measure change	<ul style="list-style-type: none"> » Student demographics of students in your field » % of undergrad research projects in your department that result in publication 	NSF Database Faculty survey
Front-end (before REU begins, after participants are selected), used to inform program design	<ul style="list-style-type: none"> » What students and mentors want, expect or fear from your REU program; » Students' graduate school plans; » Students' technical skills 	Student Surveys Mentor Surveys Interviews Skills pre-test
Formative (during REU), used to make mid-course corrections to better attain objectives	<ul style="list-style-type: none"> » Quality of mentor-student relationship » Research progress » Attitudes toward program activities 	Student Surveys Mentor Surveys Focus Groups Weekly logs/blogs
Summative (after REU), to learn whether program objectives have been met	<ul style="list-style-type: none"> » Perceptions of program usefulness » Students' graduate school plans » Students' technical skills » Students' attitudes and behaviors 	Exit Interviews Reflections Skills post-test Retrospective pre/post survey
Longitudinal (months to years after REU), to determine long-term program impacts	<ul style="list-style-type: none"> » Academic paths of program alumni (e.g., persistence in STEM majors, enrollment in graduate school) » Career paths of alumni 	Annual surveys Personalized emails National Student Clearinghouse

Table 1. Types and uses of program evaluation and examples of instruments for measuring.



A Formative Assessment Tool: The Start-Stop-Continue Discussion

Formative feedback discussions can be very informal or guided through facilitation tools. One such tool to guide discussion is “Start-Stop-Continue,” in which students are asked to identify program aspects that positively or negatively impact their experience, or that they would like to see introduced.



To facilitate this discussion, add the headings “Start,” “Stop,” and “Continue” to three flip-charts or blackboards. Ask students to brainstorm and to put thoughts on sticky notes (working individually or in pairs), and then put the notes under each heading.

Once they are finished, ask students to cluster the sticky notes thematically. Ask if a student will read the sticky notes aloud to the group. Encourage and facilitate discussion along the way, while stopping to address points.

Note: Be sure to give each category adequate time, and don’t allow the discussion to dwell on the (negative) “Stop” category.

If desired, give each student five sticky dots to place beside the points that they feel most strongly about. They can put all dots beside one point or spread them out. This gives a sense of which issues are most important to the group.

<p>Start "What should we start doing?"</p>	<p>Stop "What should we stop doing?"</p>	<p>Continue "What should we continue doing?"</p>
<p>List ideas/items that:</p> <ul style="list-style-type: none"> » <i>The group is not doing, but think they should be</i> » <i>Are new and have either come up or not been considered before</i> » <i>Address new situations or factors that may not have existed at the beginning of a project or task</i> 	<p>List ideas/items that:</p> <ul style="list-style-type: none"> » <i>Are not working for the team</i> » <i>Are not having the desired outcome</i> » <i>May have proved to be impractical</i> » <i>The team just plain dislikes</i> 	<p>List ideas/items that:</p> <ul style="list-style-type: none"> » <i>Are working well and the team wants to keep</i> » <i>The team likes and thinks are successful</i> » <i>The team may want to "stop" pieces of processes — keep team from "throwing the baby out with the bath water"</i>

Tables adapted from <https://www.people-results.com/start-stop-continue/>.

➔ **Summative Assessment: How do we collect final data?**

At the end of the REU program, a summative evaluation is conducted to assess the extent to which program goals and objectives were met. It may provide insight into the reasons why some goals or objectives may not have been met, and point to changes that might be needed in the following year.

For the summative assessment, REU site managers generally conduct a post-program survey of the students. Some programs also have an independent person conduct an interview using a script. In these evaluations, students are asked to provide feedback on the program and its elements. Sample topics include:

- » The overall internship experience
- » The student's research project scope or role in the team
- » The level of support received from mentors, staff, and peers
- » Amount of time spent working alone, with mentors, or with other interns
- » Exploration of learning experience through their participation in the program.
- » Professional trainings (e.g., science communication workshops, field trips, resume workshops)
- » Program organization and logistics (the application process, lodging, travel, administrative support)

Examples of questions commonly used in REU site post-surveys are provided in the sample survey in the chapter Appendix.

Results from the summative evaluation of your REU can be helpful to include in your annual report to NSF.



➔ Who does the evaluating?

The **REU Site PI or manager** may write the survey or interview script using their knowledge of the program, perhaps by customizing the sample surveys provided in this chapter or from other resources. Either they should have experience in evaluation, or they should get someone with evaluation training and experience to review the survey before administering it. This will reduce the chance of including biased questions, such as leading questions. Questions should be neutral.

An **experienced evaluator** from within the institution can be a good resource for writing or reviewing a survey or interview script, and is usually low cost. Such an evaluator will need to be educated about the program.



Tip: Be sure to customize materials to your REU program and to have an experienced evaluator review them before administering them.

An **external evaluator** can be paid to provide the expertise and support of writing and administering of assessment tools. The REU PI should check with their NSF Program Officer for permission to use funds this way unless it was specified in the proposal. The REU PI will need to educate the evaluator about the goals and details of the program.

Consult your NSF Program Officer on their perspective on who can or should do the evaluation and whether funds can be spent on an external evaluator.

Institutional Review Board Approval

Check with your program officer on whether a formal Institutional Review Board (IRB) to assess your data collection plan is needed. These are sometimes needed in projects that collect data from people that will be used in publications. It is important to protect the identify of REU interns, for example, by avoiding specific references that will allow a reader to identify the subject.

You will need to submit a summary of your data collection plan in the form of a protocol to your IRB. This board may be called something different at your institution, such as the Human Subjects Review Committee. Information will be requested about your project, the data that will be collected, and the ways that the data will be used. The board will decide on the level of oversight they want to have on your data collection. Each IRB works slightly differently, so check with your board.

As a rule of thumb, if you are only using your data to improve the program, very little to no IRB oversight of your project will be necessary.

If you plan to publish or report publicly on your project you will likely need to ask students and mentors for permission (“consent”) to collect data.



➔ Tips on Creating and Administering a Survey

Finding a Survey Tool to Use

There are several online tools that can be used to create surveys such as Google forms, Survey Monkey, and Qualtrics. Paper surveys can also be administered, but data will then have to be entered into a spreadsheet. If desired, you can email the GEO REU listserv with a request for sample surveys on these forms.

Optional, confidentiality and anonymity: Explain that the survey is optional. Inform the participants how their data will be used, e.g., if the data will be de-identified, aggregated, or shared with mentors.

Introducing and ending the survey: Introduce the purpose of the survey before asking students to fill it out, and add a thank-you note at the end.

Keeping the survey short: Aim to have no more than about fifteen questions. Avoid surveying students excessively or giving them long surveys, because that can result in survey fatigue.



Asking for comments can provide useful information. If you ask students to rate experiences, it is helpful to also provide a comment box.

Designing demographic questions: Collect voluntary, confidential information on gender, race/ethnicity, disability status, veteran status, and first generation college student status. There is no "right way" to do so, but there are practices that cover a lot of areas and do so in a way that is respectful. See the GEO REU website and the GEO REU Email Archives for more on this hefty topic. Consider asking for demographic information in your application form so that you have it for all candidates and not just the selected applicants.

Avoiding bias: Be sure to ask questions in a way that does not lead the respondent to give a biased response. For example, the question "Did you have a positive internship experience?" provides a bias versus "Please rate your overall internship experience on a scale of one (poor) to five (excellent)." For open-ended questions, start your questions in a way that is not leading, asking them to describe their experiences.

Post-program survey timing: Having students complete the post-program survey while still on-site will likely increase the response rate. At the latest, have students complete the survey during the first week after the program ends.

Long-term tracking: The NSF program solicitation says "it is highly desirable to have a structured means of tracking participating students beyond graduation, with the aim of gauging the degree to which the [REU experience] has been a lasting influence in the students' career paths." Consider sending out a post-REU survey six months out, and an annual alumni survey. This can help you learn where students are at in their career and about their view of the REU program's impact on their career. Keeping in touch with students through an alumni email list or a Facebook group enables continued data collection on the students' career paths.

Give a survey deadline: Giving a short-term deadline to complete the survey (such as two weeks) can increase your response rate. Follow up with those that haven't completed the survey if your tool allows.

Conducting Educational Research

Beyond program evaluation, you may be interested in collecting data to address educational research questions such as

- » In what ways were recruitment strategies effective in attracting diverse applicants?
- » In which ways do REU students improve their research skills over the course of the summer?”
- » In what ways do mentors benefit from mentoring an REU student?

For more information, see the [chapter on Publishing Educational Research](#).

Resources

Singer, J. and D. Mogk. (n.d.) “Assessment of Undergraduate Research.” Undergraduate Research as Teaching Practice, Retrieved Dec. 22, 2019, from https://serc.carleton.edu/NAGTWorkshops/undergraduate_research/assessment_pedagogy.html

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