National Alliance for Broader Impacts

Broader Impacts Guiding Principles and Questions for National Science Foundation Proposals

The National Association for Broader Impacts (NABI) Broader Impacts Working Group has developed a guiding document for the National Science Foundation's (NSF) broader impacts (BI) criterion. The purpose of this document is to assist NSF program managers, proposal reviewers, and review panels in evaluating the BI component of NSF proposals and to assist proposers with developing their broader impact plans. This document is intended to provide a means for consistency in the way review panels evaluate and rate proposed BI plans.

Types of Broader Impacts: According to the current NSF Merit Review Criteria published in the Grant Proposal Guidelines (See page III-2 HERE), the following BI goals may be considered:

- Full participation of women, persons with disabilities, and underrepresented minorities in STEM
- Improved STEM education and educator development at any level
- Increased public scientific literacy and public engagement with science and technology
- Improved well-being of individuals in society
- Development of a diverse, globally competitive STEM workforce
- Increased partnerships between academia, industry, and others
- Improved national security
- Increased economic competitiveness of the United States
- Enhanced infrastructure for research and education

The list above is not exhaustive, and it is not necessary to address more than one goal in a proposal, as long as the broader impact goal is likely to have a desired societal outcome and is well planned. However, the following five elements should be considered in the review process for broader impact activities. Each element has recommended Guiding Principles and Guiding Questions for proposers and reviewers.

TERMS/KEY WORDS

- **Broader Impact (BI) Activity:** A BI activity is a planned experience, engagement, action, function, etc. that is conducted over a finite period of time for a specific purpose and with a target audience. If the target audience is undergraduate or graduate students, the activities should be in addition to traditional undergraduate coursework or graduate student involvement. If a proposer mentions that (s)he will teach an undergraduate class/course or mentor graduate students, this, in itself, would not be considered a broader impact activity. Broader Impacts refers to activities that go beyond traditional faculty responsibilities.
- **Engagement:** The PI and/or project team mutually and actively involves target audience participants in the proposed BI activity(s).
- **Evidence-based practices:** Refers to any concept, model, or strategy that is based on or informed by evidence- such as some type of research, metrics, performance, educational research, and already established best practices.
- **Goals:** Goals are the purposes toward which the activity(s) is directed.
- **Impacts:** Benefit(s) within or to the target audience(s)/society due to the BI activity(s) as evidenced by measurable or articulated outcomes.
- **Models:** How the identified strategies or interventions will be implemented/used.
- **Outcomes:** Outcomes are the result of goals being successfully achieved. They should be measurable and measured. Outcomes demonstrate changes in awareness, knowledge, skills, attitudes, behavior, motivations, beliefs, values, capacities, or conditions of individuals, groups, organizations, systems, or communities. There can be short term, intermediate, and/or long term outcomes.
- **Practice:** The strategies selected to achieve stated goals.
- **Scalability:** Scalability defines the potential of a broader impact activity to be useful in other locations, with diverse audiences, or across a wide spectrum of contexts.

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QUESTION 1

What is the potential for the proposed activity to benefit society and contribute to achievement of specific desired societal outcomes?

Guiding Principles

- *The size of the target audience should be taken into consideration. For many BI activities that involve education, outreach, or public engagement, the size of the audience reached and the depth or intensity of their engagement are important considerations and represent a design tradeoff. A large number of individuals can be reached over a short period of time to introduce them to a scientific concept or raise awareness. A smaller number of individuals may be engaged for a deeper experience. It is important that the proposer be thoughtful about this tradeoff, make sure it is appropriate to the intended outcomes of the BI activity, and that the intended societal benefits are articulated.*
- *Other considerations can be the potential for scalability of the activities, either during the funding period or beyond, and sustainability of the activities beyond the grant.*
- *Various parameters may be included in the design of the BI activities. It is not necessary to include all parameters described, and one parameter is not necessarily more important than another. Other characteristics may include:*
  - *issues of building infrastructure within your organization*
  - *scalability*
  - *local community engagement*
  - *external partners*
  - *national scale efforts*

Guiding Questions

- **Are the BI activities being proposed clearly described?**
- **Is the audience being targeted clearly described and the rationale for engaging them clearly justified?**
- **Is the target number of engaged participants clearly described?**
- **How will the audience be recruited?**
- **What is the length of engagement? Is there a mechanism described for reaching audiences? Has the proposer described existing relationships or new partnerships, which will help them reach their audience?**
- **Are the benefits to the target audience(s)/society described?**
- **If appropriate, is a path for deploying beneficial technologies or practices clearly mapped out?**

QUESTION 2

To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

Guiding Principles

- *All BI activities should utilize evidence-based principles, practices, and methods.*

Guiding Questions

- **Are the BI activities based on existing activities/programs/infrastructure?**
  - If so, how does your program integrate STEM or education research?
  - What new elements will be introduced to the existing infrastructure?
  - How might your proposed activity transform the existing program?
  - Is this proposed BI activity leveraging other resources?
  - What is the value added by your proposed activity?
  - How well grounded is the idea in the relevant literature, or what is known about research in learning (not just the infrastructure at the PI's university, but something in the literature)?
- **Is this a new BI program/activity?**
  - What are the creative/original elements of the proposed activity?
  - How might this activity transform knowledge, process, models, etc. for the benefit of your targeted audience or society?
  - What other partners or collaborators are you bringing to this activity?
  - How does your program integrate STEM or education research?
  - How well grounded is the idea in the relevant literature, or what is known about research in learning (not just the infrastructure at their university, but something in the literature)?

QUESTION 3

Is the plan for carrying out the proposed activities well-reasoned, well organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

Guiding Principles

- *State the need and what would be contributed to the field by the proposed broader impact activity(s).*
- *BI goals and objectives should be aligned with measureable outcomes.*
- *Methods for measuring attainment of specific goals and outcomes should be explicitly stated.*
- *Goals should be specific, measurable, achievable, relevant, and time-bounded.*

Guiding Questions

- **Is there a documented justification/need for the proposed activity/program?**
- **What effective practices and/or models is this activity based on?**
- **Have you sufficiently cited the appropriate literatures?**
- **Are the goals and objectives clearly defined with measurable outcomes?**
- **How will the outcomes be measured and who will be conducting the measurement?**
- **Are the intended target audience/societal impacts of the activities described?**

QUESTION 4

How well qualified is the individual, team, or institution to conduct the proposed activities?

Guiding Principles

- *Include relevant information on the results of prior support for previously funded NSF projects.*
- *If no prior NSF support has been received, include evidence that the proposed PI and project team has the experience to successfully execute the BI activity(s) to achieve the stated outcomes.*
- *If the PI has no prior BI experience, he/she should include a partner or team member with BI experience, either from within his/her own institution or with another institution, such as an informal science education institution or a professional science education/outreach consultancy.*
- *The proposal should include a biosketch or a letter of collaboration for the BI activity partner(s) as allowed by the proposal guidelines.*

Guiding Questions

- **Is the individual's or team members' credentials and roles adequately described?**
- **Is the individual or team appropriate/adequate for the scale of the project?**
- **Is evidence provided that the PI and/or the team have the necessary experience to implement the proposed BI activities and evaluate success?**

QUESTION 5

Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities? Is the budget allocated for Broader Impact activities sufficient to successfully implement them?

Guiding Principles

- *Describe the resources provided by the PI's institution and partnering institution(s).*
- *Include a description of the resources provided in the budget justification.*
- *The budget justification should provide enough information for reviewers to evaluate the appropriateness of the necessary resources to conduct proposed BI activity(s) and reach desired outcomes.*

Guiding Questions

- **Does the institution(s) have the infrastructure to support the activities and the associated evaluation?**
- **Is the scale of the BI activities appropriate for the scale of the overall project (approximately a minimum of 10% of the total project budget)?**
- **Does the budget justification match what is proposed in the project description in sufficient detail?**