Broader Impact Review Document for National Science Foundation Proposals

This document is designed to assist NSF program managers, proposal reviewers, and review panels, in evaluating the Broader Impacts component of NSF proposals and to assist proposers with developing their broader impacts plans. This document also creates an opportunity for proposers to think critically about how their broader impact activities will incorporate into their research portfolio over time and begin to develop their " impact identity" (Risien, 2018).

The guiding principles and questions components separate each of the five criteria by which NSF reviewers are instructed to review the broader impacts of a proposal. It also includes principles and questions to consider when developing a plan to address the criteria.

*This document was adapted with permission from Advancing Research Impact Society (ARIS), Rutgers University, and the University of Texas—Austin.

GUIDING PRINCIPLES AND QUESTIONS

Types of Broader Impacts: According to the current NSF Merit Review Criteria published in the Proposal and Award Policies and Procedures Guide (PAPPG 23). NSF values the advancement of scientific knowledge and activities that contribute to the achievement of societally relevant outcomes. Such outcomes include, but are not limited to:

- 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
- Use of science and technology to inform public policy
- Enhanced infrastructure for research and education

The scope of the grant affects the degree to which one might address these goals. The list above is not exhaustive, an dit is not generally necessary to address multiple goals in a proposal, as long as the broader impacts goal is likely to have a desired societal outcome and is well planned. Accordingly, the PAPPG suggest the following five elements should be considered in the review process for broader impact activities (See Section III.A.2.). This resource includes recommended Guiding Principles and Guiding Questions for proposers and reviewers to consider when evaluating these elements.

Question 1

What is the potential for the proposed activity to benefit society or advance desired societal outcomes (Broader Impacts)?

GUIDING PRINCIPLES

- *It is important to build a long-term program of impact as part of a research portfolio.*
- *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 as well as outcome tradeoff. A larger number of individuals can be reached over a short period of time to introduce them to a research concept or raise awareness. A small 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 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.*

GUIDING QUESTIONS

- Are the BI activities being proposed relate to the goals of the project and tied to societal benefits?
- What other partners or collaborators are you bringing to this activity?
- Are the participants being targeted clearly described and the rationale for engaging them clearly justified?
- Is the target number of engaged participants clearly described?
- How will the participants 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 participants/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

- *BI activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.*
- *BI activities should utilize evidence-based principles, practices, and methods.*

GUIDING QUESTIONS

1. Are the BI activities based on existing activities/programs/ infrastructure?
   - Is this proposed BI activity leveraging other resources?
   - What new elements will be introduced to the existing infrastructure?
   - How might the proposed activity transform the existing program? What is the value added by the proposed activities.
2. 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 the participants or society?

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 measurable outcomes.*
- *Methods for measuring attainment of specific goals and outcomes should be explicitly stated.*
- *Activities should be grounded in existing and relevant literature.*

GUIDING QUESTIONS

- **Is there a documented justification/need for the proposed activity/program?**
- **Are the intended target audience/societal impacts of the activities described?**
- **Have appropriate literatures been sufficiently cited?**
- **Are the goals and objectives clearly defined with measurable outcomes?**
- **How will the outcomes be measured and who will be conducting the measurement? Will an evaluation service be used?**

Question 4

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

GUIDING PRINCIPLES

- *Include relevant information on the results of prior support for previously funded NSF projects in accordance with the PAPPG for preparing the proposal package.*
- *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, this can be listed as synergistic activities in the biosketch.*
- *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 from another institution. Institutions do not have to be academic; they may include informal education organizations, museums, and science centers, public departments (i.e. DNR, Public Works, DOT), etc.*
- *The proposal should include a biosketch or a letter of collaboration for the BI activity partner(s) as allowed by the proposal and PAPPG guidelines.*

GUIDING QUESTIONS

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

Question 5

Are there adequate resources available to the PI (either at the home organization or through collaborators) 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/organization(s).*
- *Any substantial collaboration with individuals or collaborators not included in the budget should be described in the "Facilities, Equipment, and Other Resources" section and documented in a letter of collaboration from each collaborator.*
- *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?**
- **Does the budget justification match what is proposed in the project description in sufficient detail?**
- **Is the proper documentation for resources or collaborations being utilized, but not included in the budget?**

TERMS/KEY WORDS

BROADER IMPACTS (BI) ACTIVITY

A BI activity is planned experience, engagement, action, function, etc. that is conducted for the specific purpose of providing benefit to society associated with funded research. Broader Impacts refers to activities designed to broaden the reach and benefits of research.

ENGAGEMENT

The PI and/or part of the project team mutually and actively involves targe audience praticipants or partners 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 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) to society due to the BI activity(s) as evidenced by measureable or articulated outcomes.

MODELS

A model is a causal explanation of how strategies or interventions interact to produce and intended outcome.

OUTCOMES

Outcomes are the result of activities or models being implemented. 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.

OUTPUT

Outputs are tangible results of the activity, usually the artifacts or by-product created as a result of the activity. Can be an accounting of the activities done and the participants reached.

RESEARCH IMPACT

The societal impact of research, inclusive of all research areas and all funding programs.

SCALABILITY

Scalability defines the potential of an activity to be reproduced in other locations, with diverse audiences, or across a wide spectrum of contexts.

STRATEGY

The process used to approach a problem or work toward an intended goal.

REFERENCES

Julie Risien, Martin Storksdieck, Unveiling Impact Identities: A Path for Connecting Science and Society, Integrative and Comparative Biology, Volume 58, Issue 1, July 2018, Pages 58-66, https://doi.org/10.1093/icb/icy011

This resource is based on the work done by the original NABI working group who developed the NABI Guiding Principles document in 2015. Adapted with permission from Advancing Research Impact in Society (ARIS), Rutgers University, and the University of Texas—Austin.

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