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Best Practices in Peer Review Assure Quality, Value, Objectivity

by

Robert S. Turner

The Importance of Peer Review

Many government agencies and philanthropic organizations fund research, development, or other projects. Grants management professionals including program and procurement officers want assurance that proposed work is feasible and has verifiable merit. For projects and programs underway, they may seek evidence of interim progress to justify project continuation. For projects closing out, they may wish to assure credibility of the results and conclusions before they are disseminated. Rigorous peer reviews with a high level of process integrity can help provide assurance of scientific or technical quality and value for the dollars spent. A successful review is viewed as objective and unassailable – that is, unbiased, transparent, and fair.

Effective peer reviews provide funding agency decision makers with independent perspectives from subject matter experts. Rankings and supporting qualitative evaluations by experts provide comparative information from contrasting perspectives that can be used in judging which work has the greatest likelihood of meeting the goals of the funder's program.

Evaluation of interim progress or of project results and conclusions by independent experts can help decide whether a direction is promising, or to make corrections in approach, or to close out efforts. The range of expert opinions from an effective peer review can help decision makers assess the level of certainty in those results and conclusions, and decide in what directions more work may be needed.

Organizations that grant money to individuals or companies have a fiduciary responsibility to manage that finite resource appropriately. Squandered grant money can achieve the kind of fame no organization desires. But even presuming a good outcome, what do managing organizations do to answer the question "How effective were we in realizing our goals for the grant money?" A standardized peer review process can add confidence and provide a measure of accountability to program and procurement officials' decisions. This article describes the types of peer reviews that can be conducted and ways they may be organized, and presents best practices for successful implementation of a peer review process.

Types of Peer Review

Peer reviews can be designed specifically to meet various needs:

- Research, development, and other applications and proposals: these may range from small, single-individual proposals to multi-million dollar interdisciplinary centers including technology-based economic development aimed at new job creation.
- Interim reviews or status reports of ongoing research or development projects or programs: these typically are for larger and longer-term projects and determine continuation of funding, redirection of efforts, or project termination.
- Final products such as scientific or technical reports, assessments, or productivity of self-sustaining ongoing efforts: reviews of end results may evaluate whether the products are suitable for further, downstream use, or whether the project or program otherwise effectively met its goals.

Ways to Organize a Peer Review

Peer reviews are organized to meet specific needs, but typically fall into three general categories:

- **E-reviews:** Materials to be reviewed are distributed electronically to selected reviewers who typically are given a specific charge or set of review criteria, instructions, and up to several weeks to provide ratings and supporting review comments. A program manager or review board evaluates the results and makes decisions or recommendations to fund, publish, or otherwise proceed. E-reviews are most appropriate for relatively simple proposals or products. This is the least expensive means of convening experts to review applications or proposals.
- **Panel reviews:** Selected reviewers evaluate materials on-line as in an E-review, but then meet (face-to-face or virtually) to discuss their evaluations. This interaction allows the reviewers to adjust or calibrate their ratings or comments based on improved understandings and the relative ratings of others on the panel. This process usually produces more consistent and better supported ratings or conclusions, and is often necessary for more complex proposals, progress reports, or products. The program manager or board often gains a better understanding of the reviewers' evaluations if they hear the discussion at the panel meeting. A panel review is an intermediate-cost, higher-touch version of the E-review, and usually clarifies communication among participants.
- **Multi-step, or tiered reviews:** A program manager or board may prepare a "short list" of highly ranked proposals following an E-review or panel review. The short listed proposals then are further evaluated, usually by a panel or board, sometimes including presentations by the proposers or visits to the proposers' facilities. Variations on a tiered review may be used for program progress reviews and program or product effectiveness reviews. Tiered reviews require more effort and typically are used for review of multi-million dollar programs or centers. This is the most expensive, most time-consuming way to conduct a review.

Elements of Effective Peer Review

Many options exist to tailor the review process to meet specific and changing needs. Designing an effective peer review, whether small or complex, is most readily accomplished by thinking through the key elements of the process and potential risks associated with each.

1. Design and Plan the Review

To be effective, the program sponsor meets with an experienced peer review team to customize the type of review that will best meet their program needs. Specific features are identified that accommodate mandated goals or criteria and organizational procedures, regulations, culture, preferences, and budget. Designing the review and planning it with input from an experienced peer review team provides realistic estimates of the effort required to identify, recruit, and manage capable reviewers, manage the materials and information flows, and manage the full range of necessary logistics. Working with a team that has had substantial review experience allows the program sponsor to benefit from the lessons learned of the provider, including guidelines for planning contingencies to cover unexpected events that inevitably will occur throughout the process.

Diligent effort is required to be informed and up-to-date on current laws, regulations, and rules, and to plan and carry out the review accordingly. This is a shared responsibility of the review team and the program/procurement officials who should know and communicate the rules. Those involved need to familiarize themselves with the rules that apply to the sponsoring organization and follow them.

2. Identify and Recruit the Experts

Program requirements and manager preferences define how qualified reviewers are identified, recruited, and managed. The program sponsor may have a group of proven reviewers who they have used in the past, may suggest a list of reviewers that may be augmented by the peer review team, or may assign the task completely to the peer review team. Depending on the circumstances, the program manager may want to approve the reviewers selected or may want to maintain a “hands off” stance to ensure independence.

A common concern is that not enough conflict-free reviewers in a particular discipline can be found, or that those qualified are already overused or too busy. Sometimes managers don't see value in seeking external assistance. Recruiters experienced with finding reviewers for multiple sponsors maintain internal data bases and also use external data bases containing national and international listings of experts. They often can find qualified reviewers beyond those well known in the discipline. When a discipline has very few practitioners, a recruiter often can find qualified reviewers in closely related or allied disciplines. For added assurance that qualified individuals have been identified, screeners knowledgeable in the field may be used to validate reviewer expertise. Resumes or full CVs are gathered to document reviewer qualifications. Even when qualified experts can be identified, they sometimes decline to participate.

It is important to understand the reasons why experts decline, and implement strategies that will ensure success. Compensation that is commensurate with expertise and amount of work assigned, respectful use of reviewer time through clear and efficient electronic tools and instructions, and full logistics support for travel and reimbursement allow experts to focus their limited time on the review. Scheduling the review to avoid conflict with professional meetings or other community or religious events is important. Providing intellectual return for reviewers through interaction with peers on new and interesting ideas, with minimal inconvenience, helps them accept a commitment to review and encourages them to participate in the future. Building good relationships with reviewers improves acceptance rates and encourages colleague referrals when they are unavailable.

A key step in reviewer selection is evaluation for conflict of interest. Outcome of a review can be tainted or overturned if results are shown or even perceived to be biased by personal or organizational conflict of interest. Criteria for defining and screening conflict of interest vary for different types of review. Many agencies and organizations have well-defined conflict of interest policies that are used to guide the process. If an organization does not have an established policy, a policy from a similar type of organization or review can be customized in the review planning stage to guide the evaluation. Reviewers usually are asked to sign a certification that they do not have a conflict of interest before they are finally approved as reviewers, and sometimes again at the end of the process, recertifying that conflict has not been discovered during the course of the review.

3. Conduct the Peer Review

An effective peer review can be conducted in less than a month to over a year, depending on its type and complexity. Maintaining the integrity of the process throughout depends on the peer review team effectively managing the logistics of the review and the performance of the reviewers.

A clear charge to the reviewers, with well-defined criteria for evaluation and superior instructions for completing the review, is key to a successful review. The ranking or scoring schema must be clearly described, and how it and the supporting comments will be used should be explained. The reviewers must have opportunity to ask questions and receive feedback from available review team staff or the program manager. The review team can monitor results as they are submitted by the reviewers and request that clarifications be made and incomplete questions answered. If a panel meeting is scheduled, that occasion can be used by reviewers to calibrate disparate scores and clarify supporting comments.

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Sometimes conflict of interest or reviewer bias emerges as a review progresses, potentially threatening the integrity of the process. Program managers and the review team must diligently monitor for conflict of interest and bias throughout the process. If personal or organizational conflict of interest is discovered, reviewers may recuse themselves from that part of the review. In the worst case, a reviewer may have to be dropped from the review. There may be cases in which conflict of interest is not clear but in which reviewer bias is apparent. In cases where the disciplinary field is small, all potential reviewers may be conflicted. When conflict of interest and/or bias cannot be avoided, it must be carefully managed. This may be accomplished, for example, through balancing review panels with diverse or opposing biases and/or through careful moderation of the proceedings to ensure that there is full discussion of all perspectives. How the conflict of interest or bias was managed should be clearly documented in review reporting to ensure transparency.

On-time completion of reviews can be assured using a well-constructed review project management plan that considers review vulnerabilities in its approach and includes plans for unexpected emergencies. Incorporation of anticipated risks into a review management plan or proposal is a strong indicator of whether review planners have a thorough grasp of all contingencies that must be covered to make a review successful. Examples that can be anticipated and resolved through advanced planning and responsive project management include travel interruptions, reviewer delays and/or withdrawal, electricity or internet outages, and facility and personal emergencies.

4. Manage the Information

No matter how large or small, a successful review depends on effective management of sensitive information. Materials to be reviewed often come with voluminous supporting materials. Ratings and text comments from multiple reviewers for each item being reviewed must be tracked, quality checked, and calculated into overall ratings, aggregated, and/or summarized. Timely progress and final reports are needed by the review team and program manager, review board, or next-tier panel in formats useful for efficient interpretation and assessment of the results. This information inevitably includes sensitive and proprietary information, personal identifying information, and identity of the (usually anonymous) peer reviewers, all of which must be securely protected.

All materials to be reviewed, along with supporting documentation, should be received electronically in limited common formats. They then can be distributed electronically, preferably through a secure (and green – no paper) web-based application that provides the reviewers quick access from any location at any time.

The application should provide reviewers clear and concise questions to be answered and a pick list of scores or ratings. The reviewers can enter their comments and ratings directly and conveniently into the application's entry fields. Entries can be spell-checked before the reviewer leaves the application. Individual scores or ratings are automatically incorporated by the application into calculations of overall ratings or rankings for the review by proposal, panel, or reviewer. Review progress can be monitored real-time through the application by authorized users such as program managers and the review team. Reviewers with apparent outlier ratings or comments, or who are otherwise underperforming or delinquent, can be contacted by a member of the review team or the program manager for discussion.

Comments and ratings can quickly be aggregated and analyzed at any time, providing instantaneous reports of various types during or at the end of the review for decision making by the review sponsor. These reports can be intuitively and easily generated and customized by program managers, providing real-time results and eliminating the sometimes long wait for production by others.

Most reviewers are aware of and respectful of the proprietary and confidential nature of the information to which they are being given access. Good review protocol reminds them at all steps of the reasons for protecting sensitive information. Some reviews require reviewers to sign non-disclosure agreements. A cyber-secure web-based information management system does not eliminate risk of information compromise, but it reduces risk by eliminating easily redirected, insecure emails containing review materials, reviewer comments, and other sensitive information.

5. Document the Process and Implement Improvements

An effective peer review process provides continuity, consistency, security, and continuous improvement across programs and over time. It can assist with “corporate memory,” providing documentation for experienced program managers and new staff on how things worked in the past. But the process is not static. It captures and records lessons learned and experiences from every review for implementation in the next review.

The review process and protocols for each review are clearly documented in a review management plan. Lessons learned for each review are discussed and documented internally by the review team. A de-brief regarding how well the review served decision-making needs and preferences is held immediately after the review by the review team with the program manager and/or procurement official. Reviewers are surveyed after each review for their feedback. Findings from each of these are recorded and made accessible for planning the next review.

Conclusion

Effective peer review is an important part of the process for assuring outcomes that have high quality and value for the expenditure of funds, whether from taxpayers or other benefactors. The core concept or process of topic-area peers reviewing and providing quantitative and/or qualitative feedback can be customized to meet most any review need. Rigorous peer reviews can be designed to evaluate likelihood of success for proposals or applications, review the progress of ongoing projects or programs, and assess the products or outcomes of projects or programs for various measures of success. Effective reviews may range from relatively simple and inexpensive E-reviews of proposals or products to complex and resource-intensive, multi-format reviews of the progress or productivity of large projects, programs, or centers.

The key to success of any review is maintaining the integrity of the process so that its outcome is viewed as unassailable, that is, unbiased, transparent, and fair. Opportunities for breakdown of the process exist, but a risk-based approach to planning and implementing a review helps assure a high likelihood of success.

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