Conclave in the Tower of Babel: How Peers Review Interdisciplinary Research
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Peer Review is a practice of research assessment where a researcher’s work is evaluated by colleagues working in the same field on similar topics. Since interdisciplinary research is always a new synthesis of expertise, the problem arises that peers in that sense don’t exist. The aim of the paper is to show how under these conditions a specific institutional form of peer review enables the successful assessment of interdisciplinary grant proposals. The basis is an empirical study of research networks that consist of research groups belonging to different specialties. The peer review procedure is successful because reviewers and applicants have ongoing scientific communication and because the core practice of the process is the group discussion among reviewers and between reviewers and applicants. The success of this procedure is limited to areas where interdisciplinary research is part of the everyday work and where only a ‘moderate interdisciplinarity’ is intended.

Introduction: Peer review of interdisciplinary research – a contradiction

Peer Review is a form of research assessment where a researcher’s work is evaluated by her scientific peers who are supposed to be colleagues working in the same field on similar topics. Since interdisciplinary research is always a new synthesis of expertise, the problem arises that peers in that sense don’t exist because none of them can be competent in all aspects of the project. The very few studies that investigated (interdisciplinary) peer review processes (rather than outcomes) lend support to this view (Porter and Rossini 1985: 36; Travis and Collins 1991: 336; Langfeldt 2001).

Since there are no alternatives to peer review regardless of its shortcomings, it seems necessary to make peer review work under these conditions. Can we design a peer review process enabling the assessment of interdisciplinary research? This question could be expected to be answered by the fast growing bodies of literature about interdisciplinary research and about peer review. However, recommendations on the design of the assessment process are rather philosophical in nature, and are not based on empirical investigations of interdisciplinary peer review. A theory of the impact of different institutional forms of peer review on funding decisions for different types of interdisciplinary research is still lacking. The following study is an attempt to make a contribution to such a theory by analysing a specific procedure of interdisciplinary peer review and identifying the reasons for its success.

Conceptual and analytical framework

The dominating perspective on peer review is scientistic in that peer review is seen as a rational decision-making process in which a set of ‘objective’ criteria is applied consistently by various reviewers. It is underlying most criticisms of peer reviews as well as suggestions to improve it (e.g. Cicchetti 1991). Recently, this perspective has been challenged from a constructivist point of view. It is argued that peer review is a process of collective construction of knowledge claims (Hirschauer 2004). The peer review process has hardly
been studied thoroughly from a sociologist of knowledge perspective. However, observations in the context of laboratory studies (e.g. Knorr-Cetina 1981) and analyses of texts (Myers 1993) support the conclusion that actors who take part in the peer review process (such as authors/applicants, reviewers and editors/funding agencies) apply their own individual idiosyncratic perspectives on the existing knowledge and shape the proposal or publication with their critiques and ideas until it accommodates all these perspectives (Gläser 2004: 67-71). Interdisciplinary research can be assumed to strengthen these idiosyncracies because it uses knowledge claims from different specialties. The degree of interdisciplinarity can be very low or very high, depending on the number and dissimilarity of the involved knowledge claims (Laudel 1999: 36-37).

This interpretation of peer review implies that it is occurring in a complex actor constellation, and that it must be analysed as a negotiation and knowledge creation process rather than a decision process. I will therefore apply an analytical framework of actor-centred institutionalism (Mayntz and Scharpf 1995; Scharpf 1997). Although I cannot outline the details of this framework here, its application leads to the following questions:

1) What does the actor constellation in which the review takes place look like in terms of participants, their roles, interests, and power? How does this actor constellation emerge?

2) What are the epistemic, institutional and other conditions of action under which the review takes place?

3) What negotiation/knowledge construction processes occur in this actor constellation? Which actors take part in which interactions?

4) What is the outcome of the negotiation/knowledge construction processes? How does the outcome relate to the interests of the actors?

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**Data and methods**

As part of a larger qualitative study, I analysed the peer review processes of two collaborative research networks (in German “Sonderforschungsbereiche”, abbreviated as SFB). SFBs are networks of 10 to 20 research groups which receive additional funding for pursuing a collaborative research programme. The initial funding proposal and proposals for extensions that have to be submitted every three years are evaluated by peer review. Since the funding program aims to promote interdisciplinary collaboration, a SFB consists of research groups from different scientific specialties.

I investigated two SFBs that worked in an interdisciplinary field in which biological, physical and chemical approaches to a common object were combined. The conceptual considerations implied that the investigation could not be limited to the outcomes of the review process but had to include the emergence of the actor constellation and the negotiations within this actor constellation. In other words, it was necessary to reconstruct the review process. In order to achieve this reconstruction, I combined three different types of methods. I analysed all documents that were produced in the review process. Semi-structured interviews were conducted with reviewers, principal investigators and program administrators in the funding agency. Additionally, I observed one SFB peer review process. While the observation of the
confidential parts of the process was not permitted, I could observe the more ‘public’ parts of the discussions between the reviewers and the SFB members.

Results

The Actor Constellation

Three groups of actors take part in the review process: the reviewers; the scientists of the research network; and the delegates of the funding agency (the German Research Foundation, in German “Deutsche Forschungsgemeinschaft”, abbreviated as DFG). The latter consist of two administrators and two members of the DFG’s Grants Committee for SFBs, one of whom is scientifically ‘remote’. The task of the ‘remote’ member is to prevent cognitive coalitions and to support comparisons between SFBs from different fields.

The reviewers who assess the SFB are selected as a result of a negotiation process between the scientists who apply for funding and the Head Office of the DFG. In order to secure that the SFB will be assessed by competent and unbiased reviewers, the DFG Head office selects referees from the DFG’s general ‘pool’ of reviewers and from a list of proposed reviewers submitted by the applicant. The prime criteria for the selection of reviewers are competence; absence of obvious indicators for conflicts of interests (exclusion of former teachers/pupils, direct collaborators, direct competitors, etc.); coverage of all specialties participating in an SFB; and achieving a mix of specialists and generalists. After the list of reviewers has been composed, the applicant may raise objections against proposed reviewers. This didn’t occur in the investigated SFBs but has led to the removal of reviewers from the list in other cases.

In the end, a group of eight to fourteen referees is composed, depending on the size of the SFB and the number of different specialties it contains. This group of reviewers accompanies ‘its’ SFB over the whole period of its existence, but will be partly renewed for every three-year funding period. It has become a standard practice to invite the referees to scientific meetings of the SFB during the funding period. This participation and the contacts with the applicants during the whole period (often over many years) led to the emergence of both scientific trust (trust in the competence of reviewers respectively applicants) and social trust (trust in the correct behaviour of all actors).
The Negotiation/Knowledge construction process

Figure 1 shows the main steps of the review process. One of its unusual features is that the scientists whose proposals are assessed take part in five of the seven steps.

(1) The Process begins with negotiations about the actor constellation itself, i.e. about the reviewers who take part (see above).

(2) The DFG programme officer assigns about four to five SFB projects to each reviewer for which the reviewer is directly responsible. Among these projects is one that lies at the margins or even outside of the reviewer’s area of expertise. The reviewer receives the SFB research proposal and – in later funding periods – the SFB research report. The applicants may send publications to the reviewers.

It is expected that the referees make themselves familiar with all other projects of the SFB proposal, too. Indeed, all interviewed reviewers knew not only the projects assigned to them but had also read at least large parts of the whole SFB proposal.

(3) The third and all following steps (the assessment itself) take place on the site of the SFB. The assessment procedure is neither anonymous nor completely secret but involves direct
interactions between applicants and assessors. It relies on group discussions among the reviewers as well as between reviewers and applicants. The on-site assessment begins with visits to the laboratories. The reviewers visit the laboratories of ‘their’ projects in order to get an impression of the existing research equipment and to have first discussions with the applicants.

(4) The SFB now presents itself in a report colloquium and a poster session. In the report colloquium the SFB presents itself as a whole, while in the poster session each research group presents its project(s). The reviewers are obliged to discuss the projects with the applicants, including projects which do not belong to their own research area.

(5) A preliminary discussion of the reviewers follows in which questions to the applicants are formulated.

(6) These questions have to be answered in the so-called proposal discussion between applicants and reviewers.

(7) The Conclave of the reviewers is the final assessment of the SFB proposal. Assessments are made at both the level of single projects and the level of the whole research network. The reviewers which were assigned to a certain project discuss the project first, before the whole panel becomes involved. The moderating DFG programme officer ensures that the discussion is not dominated by single reviewers.

Each project is discussed extensively in order to gather all aspects and to form a shared opinion about it. Only in exceptional cases the reviewers vote. If there is only a narrow majority, then the discussion will be continued.

Besides assessing the single projects and their integration into the SFB, the SFB is assessed as a whole: how well all projects are connected; if additionally specialists are required in order to conduct research in the SFB’s subject area; if the SFB is innovative; how the collaboration developed etc. Since many reviewers assess more than one SFB, they are able to make comparisons between different SFBs. Unfortunately a detailed reconstruction of the interdisciplinary assessment at the macro-level could not be achieved because the interviewees were unable to describe these processes with the required precision.

**Outcomes**

The results of the assessment consist of recommendations for funding which are usually followed by the decision-making bodies of the DFG. When an SFB is approved for funding, the recommendation usually contains cuts to the original proposal, e.g. some projects might not be funded, other projects receive fewer funds than they applied for.

While there are still grounds for contesting these judgements, the most likely argument against the funding recommendations (lack of understanding on the side of the reviewers due to the interdisciplinary character of the proposal) did not occur. None of the interviewed SFB scientists complained about insufficient competencies of the reviewers (not even scientists whose proposal was rejected). There is a general agreement that the procedure works well and leads to fair decisions.²

Therefore, it can be assumed that both the process of selecting reviewers and the way interactions between reviewers and applicants were designed secured the necessary competence that is required for interdisciplinary peer review.
Discussion: Strengths and weaknesses of the process

Two main conditions are responsible for the success of this specific interdisciplinary peer review process. The first is the specific kind of interdisciplinarity that is under review. The field of both SFB’s is characterised by an interdisciplinary culture that emerged as a result of decades of successful interdisciplinary research, in this case the use of methods and objects from different specialties. Scientists from different specialties (including the reviewers) have already developed a general ability to communicate with each other. They have learned to ask the right questions and to present research results in a simplified way that is accessible to colleagues from other fields. Interdisciplinary approaches are primarily seen as opportunities to produce new knowledge and get the benefit of the doubt.

The second reason for the success of the described procedure was the procedure itself, i.e. a specific process that secures competence, communication, and trust. The critical elements of this procedure – the strengths of the process – can be described as follows. Firstly, the participation of applicants in the selection of reviewers made sure that all aspects of the interdisciplinary work could be competently assessed while the funding agency made sure that obvious conflicts of interests and cognitive particularism (Travis and Collins 1991) were avoided. Secondly, the core practice of the assessment process is the group discussion, both between reviewers and applicants and among reviewers. A significant amount of time is set aside for these discussions. The reviewers spend two days on-site. Thirdly, the process is embedded in the everyday scientific communication of applicants and reviewers, who conduct scientific discussions at the workshops and conferences of the SFB.

Both group discussions and the participation of reviewers in scientific meetings of the SFB create the common knowledge background that is necessary for successful interdisciplinary communication. These communications include the progress of ongoing and the design of future research projects. Thus, trust in the research groups under review emerges.

The described strengths of the analysed process are inevitably linked to two important weaknesses. Firstly, the process is both expensive and time-consuming. Its time-consuming nature contributes to one of the major trends in current science, namely the overuse of scientists as assessors of their colleagues. Therefore, the process only seems applicable to rather important funding decisions. Secondly, the emphasis on a common basis for communication and consensus requires a ‘reasonable’ interdisciplinarity, i.e. a combination of fields or approaches that are plausible to the reviewers in the light of the applicants’ previous interdisciplinary research. Extreme interdisciplinary combinations, which lay outside the area of consensus that emerges in the described process still have less chances of success in the peer review process.

Concluding remarks

The problem of interdisciplinary peer review is of relevance for many research processes. Besides the increasing number of interdisciplinary research processes the problem of peer competence also applies to research processes that on the surface appear purely disciplinary. We have to take into account that interdisciplinarity is defined as a continuous variable that
expresses the cognitive difference between the various ‘knowledges’ that are combined in a research process. Thus, it is worth investigating how the tension between applicants’ and reviewers’ specializations (the most common indicator of a certain degree of interdisciplinarity) is solved in peer reviews of grants and publications.

An important methodological problem is the reconstruction of peer assessments. Scientists who act as peers only recollect their assessment activities to a certain extent. It appears to be crucial to apply fine-grained methods such as ethnographic observations in order to find out what reviewers actually do when they are assessing their colleagues work and how their practices vary.

Footnotes
1 The term “interdisciplinarity” has become common in sociology of science. In fact, we do not refer to disciplines here which are the units of teaching but to the much smaller units of specialties (see Chubin 1976: 448).

2 That the funding programme for SFBs is regarded as successful by science policy has been shown by an independent evaluation (Wissenschaftsrat 1998).

References


