

Workshop Session 2.C. Measuring and assessing scientific excellence

Measuring Scientific Excellence: Definitions, Processes and Monitoring Outcomes

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Summary:

This presentation will focus on experiences over the past decade as a member of national review committees for research grants, scholarships and fellowships. Not only is the “excellence of the researcher” (demonstrated or potential) a common criterion, it is heavily weighted in all of these assessment processes. NSERC has implemented a number of practices to ensure fair assessments and consistent application of its policies and those that relate to gender issues will be highlighted. A recent report (Women in Science and Engineering in Canada, Natural Sciences and Engineering Research Council of Canada, April 2006) includes gender statistics for NSERC’s major training and grant programs.

In 2000, the Government of Canada created the Canada Research Chairs program as a key component in the national strategy to become a world leader in the knowledge-based economy. Gender-based analysis of chairholder nominations and awards has been a contentious element of the program’s short history. The Canada Research Chairs program will be used to illustrate the need to critically examine criteria for excellence, recruitment and assessment processes in terms of potential gender bias and to monitor outcomes by gender.

INTRODUCTION AND CONTEXT

To set a framework for this workshop, the organizers have posed the following questions:

What initiatives have already been put in place to address fundamental change in the scientific system (universities, research institutes, funding agencies, industry) and what have we learned from both successful and unsuccessful initiatives, programs, policies or mechanisms?

I will use the ten minutes that I have been allotted to present a few examples from Canadian review processes with a particular focus on the assessment of research excellence in the academic community.

CANADIAN EXAMPLES

Over the past decade, I have been a member of NSERC (Natural Sciences and Engineering Research Council of Canada) review committees for individual research

grants, for strategic initiatives and most recently for scholarships and fellowships. In all of these reviews, the one common criterion is “**excellence of the researcher**” either as demonstrated over the most recent 6 years or the potential for excellence in the case of early-stage researchers. The quality of the research proposal is also important but without convincing evidence of researcher excellence an application will fail.

The NSERC peer review system is highly respected in science and engineering departments in Canadian universities and success in obtaining NSERC funding is also an important indicator of excellence in promotion and tenure reviews within the academic world. So scientific excellence is a prime criterion within NSERC’s review system and success in this review system is also a metric for researcher excellence in Canada.

This respect for the NSERC peer review system is well deserved because NSERC has taken pro-active steps to ensure fair assessment processes and to make sure that its policies are implemented in committees’ decision-making. I regard them as “best practices” and I have used NSERC models in developing internal review processes at my own institution. I will highlight some examples that are specific to the assessment of researcher excellence and particularly those that are relevant to potential gender bias.

The starting point is clear statements that define each review criterion. These are included in the peer review manual that is developed for each funding program¹. The NSERC guidelines for assessing researcher excellence are multidimensional, include a number of indicators of researcher productivity and emphasize significance and impact of scientific contributions rather than volume. In their personal data forms, applicants are asked to identify up to five of their most significant research contributions in the last six years and to explain how these contributions have influenced their field. My experience is that review committees do not focus narrowly on numbers of publications and that there is often candid discussion of significance and impact of contributions that is fair to early-stage and established researchers. The clear criteria statements and examples are very helpful in guiding discussions and ensuring that NSERC policies are followed.

In addition to the opportunity to highlight different types of contributions, applicants are asked to describe any circumstances that have delayed their research or affected dissemination of research results. This section was introduced to the personal data form about 15 years ago to recognise that there may be many extenuating circumstances that affect productivity, including periods of pregnancy or early child care. In my experience, both males and females take advantage of this section of the personal data form and committees give serious consideration to explanations for delays. I think that committee members are comfortable making adjustments for different levels of productivity when they are comparing applicants over a short time frame. In most reviews this is a six-year window but it may be shorter time period for a graduate student or post-doctoral fellow.

¹ Peer review manuals are distributed to committee members and are available online for the entire research community. For example, the 2006 Peer Review Manual for Grant Selection Committees is available at http://www.nserc.gc.ca/commit/prm2006/table_e.htm. Section 6.8 defines the criteria for the review of Discovery Grant applications.

I think that it is more difficult to factor in discussions of productivity that are based on a longer term such as a career and I will come back to this issue.

I also know that some women, particularly if they are relatively inexperienced in writing research grants, are still cautious about including details on a maternity leave. Just last week I attended a roundtable discussion at another university and I had an informal discussion with a woman who is applying for her first renewal of research funding this fall. She did have a child during the period of her last grant and through some creative pioneering, she and her husband were able share their family leaves on a weekly basis. For both of them, this had been a successful way to share responsibilities and balance their research programs. She was worried that there might be stigma attached to mentioning a maternity leave in her upcoming application. I highlight this example to illustrate that a single best practice is not sufficient on its own.

There is a need to have a suite of best practices that work together. For example it is important to combine NSERC policy on maternity leaves with mentoring and advice to young researchers on how to present personal information in a research application. This includes not only the explanation of extenuating circumstances but also the presentation of the five most significant contributions. I review many draft proposals and I find that women do have difficulty making strong statements about their contributions. As Susanne Baer pointed out in her presentation this morning, the Latin root of excellence (“excellere”) means to “stand out” or “to be distinguished”. While women remain a minority as academic researchers in science and engineering, there is a certain discomfort in “standing out” (you already feel that you do) and there are masculine norms for “distinguished”. Mentoring on some of these issues is important but unfortunately mentoring of junior faculty is still often left to chance in many units. As a result, women in science and engineering disciplines may miss out – with significant implications in terms of getting started in a research career.

In April of 2006 NSERC produced a detail report on Women in Science and Engineering in Canada and included gender statistics for its training and research grant programs. In general there is evidence that NSERC funding to females exceeds the population level for student support and is just slightly below at the faculty level. Success rates by sex are comparable for most programs. So there is good news and some areas to look at more closely. If there are questions about more specific details, these can be raised in our discussion later.

However I also want to say a few words about the Canada Research Chairs Program (<http://www.chairs.gc.ca/>). This program was created in 2000 as a key component in the national strategy to become a world leader in the knowledge-based economy. The Government of Canada has provided funding for 2000 chairs to build a critical mass of world-class researchers. Chairs are allocated by tier level and by discipline group with 80% of the Chairs in the natural sciences, engineering and health. I do not have time to

go into details of the program but gender-based analysis of chairholder nominations and awards has been a contentious discussion for the past five years ².

Nominations are made by individual institutions and reviewed by 3 members from a College of Reviewers. The College includes academics from national and international institutions and I am a member of the College. The criteria for the peer review process are clear. As a reviewer I have seen excellent candidates come forward as nominees. However I am not convinced that the local-level search processes at individual institutions have succeeded in recruiting evenly from the pools of women who are qualified for these awards. The Tier 1 awards are at a senior career level and this is where the norms are still defined by males, many of whom have not taken career breaks for family responsibilities. There are large variations among universities in terms of the nomination of women as candidates for chairs. The representation of females as chairholders has doubled from a level of about 15% in the first two years when the first gender-based analysis was done to a level of 28% in 2005 (http://www.chairs.gc.ca/web/media/statistics_e.asp). I do not think that this change would have occurred if the gender-based analysis had not been initiated at the early stages of the program.

CONCLUDING STATEMENTS

I have chosen these few examples to emphasize three components that I think are critical for fairness in the measurement of scientific excellence. The first is to recognize the need to define clear criteria for scientific excellence and to provide guidelines that recognize different types of contributions. The second essential component is to understand all of the processes that are part of a measurement system – it is not sufficient to focus on the committee decision-making process alone without recognizing how nominations get to the committee process. And finally it is essential to build in monitoring of outcomes by gender. In 2006, measurement and assessment processes for scientific excellence are still largely human processes. Only with quantitative feedback on gendered outcomes will there be appropriate actions to address inequities.

I look forward to our discussion later in this workshop.

² Gender-based analysis of the Canada Research Chairs program has been reported to the CRC Secretariate by Nicole Bégin-Heick & Associates (November 2002) and R.A. Malatest & Associates (December 2004). In 2003, eight women professors brought forward a complaint to the Canadian Human Rights Commission concerning the Canada Research Chairs Program.