

PSM Program Assessment from All Perspectives¹

Introduction

Effective assessment, based on empirical data rather than perceptions, is essential for establishing legitimacy and enhancing new programs such as the Professional Science Master's (PSM). Assessment data provide information to all stakeholders on whether PSM goals are being successfully met and also provide program personnel with feedback to propel ongoing improvement in quality. Evaluation of PSM programs focuses around the question "Are PSM programs and degrees delivering what was promised to students, institutions, employers, and society?" Students (and their parents) want to know if the PSM degrees help graduates attain desirable jobs with good salaries. Administrators in educational institutions expect a new source of students, tuition, positive public relations and industry relationships. Employers are looking to the PSM to provide a new kind of skilled and flexible employee, as well as a different kind of collaborative contact point with academia. Assessment helps to provide evidence to back up claims that PSM graduates have qualities such as "critical thinking," "scientific and mathematical literacy," "communications, teamwork and computer skills," "problem-solving strategies" and "business cross-training." At the local, state and national levels, funding sources and politicians will be interested in whether PSM programs can document contributions to economic development and workforce enhancement.

Such an expanded set of stakeholders and expectations create special challenges for PSM review processes, especially in the identification and recruitment of knowledgeable "authorities" to both participate in evaluation and make sound recommendations for future development. The well-constructed evaluation begins with internally-created clear and concise statements of programmatic goals or objectives, recommendations for appropriate measures of successful outcomes, and a strategy for "closing the loop" by using feedback to modify programmatic elements. The specific issues that will command priority status in assessment will differ as programs mature. Newer PSM programs will likely concentrate on evaluation of admissions and curricular issues, while more mature programs will focus on graduate employment outcomes and employer relationships with the program.

At the heart of the successful PSM degree program is a tripartite collaboration between academic, public, and private sectors. Input into program evaluation must be similarly multifaceted. Surveys must be developed for each constituency and should be brief, on-line forms with check-off options. Higher response rates will be more likely if surveys are coordinated and infrequently requested. Most institutions of higher learning have existing institutional units that specialize in assessment (institutional research, education, career services, etc.) and taking full advantage of such resources will aid in PSM assessment design, as well as data collection and analysis. Best practices require that the

evaluation process be transparent and that data and conclusions be available to the public. A comprehensive assessment that occurs once every few years is more valuable than annual, less thorough evaluations.

Overview of Assessment

The time-frame for assessment is divided into three periods: Pre-application (period before admission), matriculation (period after admission and until graduation) and post-graduation (period after graduation). The diagram below shows the individual items subjected to assessment ("assessment unit"), the actual data to be assessed ("measurable"), and the "experts" who are responsible for the assessment ("assessment authority").

PERIOD	Pre-application	Matriculation	Post-graduation
ASSESSMENT UNIT	Applicant pool Program Institution	Program Students Curriculum & courses Program Director Institution "Unspoken"	Employment Employees Program Continuing education
		Admission	Graduation
		Student expectations	
		Δ Employment	
MEASURABLE	Admissions metrics Program characteristics Institutional strengths Employers needs Recruitment efforts Marketing efforts	Enrollment and revenue Resources vs. demand Program quality Student performance Faculty/staff metrics Expectation vs. experience Employer alliances	Graduation metrics Time of employment Employer Job title Salary range Length of employment
ASSESSMENT AUTHORITY	Students Admissions committee Employers	Students Graduate School Faculty Institutional research External instructors	Alumni Employers NPSMA Graduate School Career Centers Institutional research
	Program Directors		
	Employer Advisory Board		
	External review		

Pre-application

Assessment: During the pre-application period the PSM programs are assessed by multiple parties. These include students, program directors, admissions committees, executives performing external reviews of PSM programs, and employers. Students evaluate the specific programs and the program host institutions. They are likely to rank items such as the level of accessibility to information, program content and specific strengths, location, financial aid opportunities, post-graduate potential for employment etc. Program directors evaluate applicant pools to assess recruitment and marketing efforts. Together with university admissions committees they review specific data such as GPA, GRE, TOEFL, work experience, attitude, program compatibility, diversity, and ratio of admitted candidates. In addition, the application criteria, process, and overall effort and outcome should be reviewed externally. Finally, employers (often as participants on program advisory boards) assess if programs are going to meet their work-force needs. They evaluate program content in advance of supporting their own employees' wish to pursue a PSM degree or before hiring a new employee with a PSM degree.

Some issues and recommendations: Because PSM degrees are different from traditional degrees it is desirable that PSM

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programs have distinct admissions and evaluation criteria while maintaining rigor. We recommend that specialized admission criteria such as those described above are used and that PSM programs have their own admissions committees. Other important issues are the necessities for increased visibility of the PSM degree and maintaining distinct and separate identities from preexisting, traditional degrees. We suggest that the PSM degrees be marketed extensively on the internet and elsewhere and that strategies be devised to explain PSM programs and the difference between PSM degrees and their traditional counterparts to all of those who instruct or advise students and employ graduates.

Matriculation

Assessment: Students, program directors and their peers (faculty, graduate school), host institutions' internal research units, external reviewers and employers are part of the assessment authority during the matriculation period. Students give feedback concerning curriculum, courses, employer interaction (projects, internships) and the quality of the institution in terms of the education they receive. They assess whether or not the programs are meeting their expectations and providing the necessary training for future careers. Administrators evaluate enrollment and revenue data, student performance and academic standing, retention, the adequacy of resources, and alliances built with employers. Program directors use the same information to continuously review the quality of the programs. Other elements of quality include individual courses, availability of these courses, faculty participation, "plus" coverage and student internships and projects with potential employers. In addition, institutional research may be done concerning student learning outcomes. Program directors' peers and superiors are evaluating program and director performance, often using faculty/staff metrics such as publications, grants, and employer alliances, in addition to a range of "unspoken" expectations. Also, employers may assume new, less well-defined roles, such as instruction during a course or internship, in addition to those described under pre-application. Employers typically provide valuable advice concerning whether or not the program is on track to meet future needs and make suggestions for adjustments.

Some issues and recommendations: A rather large issue is the level of alignment of PSM and traditional academic cultures (described in more detail in the section on impacts of culture conflicts on assessment). One example of a disconnect between the two occurs when "plus" courses are evaluated using standard course evaluations which are likely to be inappropriate due to the very different nature of content and delivery of some "plus" courses. We recommend that special "cultural" provisions are made to accommodate PSM programs, so the assessment of programs and "plus" courses can be separate and include employer input. Although employer feedback is essential, it is important to recognize that employer needs for skills and employees may be volatile and that input may be complicated by highly dynamic agendas. To solve this issue we recommend working with several employers simultaneously. Finally, students may be

reluctant to criticize program components because they have concerns about anonymity in providing such responses. This issue is not unique to PSM programs and can be alleviated by implementing procedures in which it is not possible to track the respondent.

Post-graduation

Assessment: The promise of the PSM programs are readily evaluated after graduation. During this time graduates (alumni) will assess if they can obtain employment and if the employment criteria and conditions (time to employment post graduation, entry level job titles, salary ranges, time in service, promotions and changes between employers) have improved compared to pre-PSM-enrollment. Program directors, university career centers, graduate schools, institutional research units, fundraising units, PSM cohort members, external reviewers and the NPSMA will likely also attempt to track such data. We recommend maximal cooperation among these parties to avoid duplication of effort and reduce the nuisance factor in repetitive soliciting of graduate and employer information. In addition, these parties have interest in assessing the graduation metrics (GPA, time to degree completion) as well as learn if the graduates intend to pursue continuing education (including Ph.D.). Employers (direct supervisors and human resources personnel) will assess the competitiveness and performance of their new employees.

Some issues and recommendations: Due to the difficulty in tracking an upwardly mobile and "entrepreneurial" set of graduates and the high turn-over rates of employer alliances, data sets may not give a complete or timely picture of the actual facts. Also, response rates to surveys may be low due to concerns about confidentiality or level of priority. We recommend obtaining permission from alumni to collect and store information in local and national databases. We also propose establishment of strong alumni network and PSM cohort groups to assist tracking efforts, and use of the internet to maintain contact with alumni.

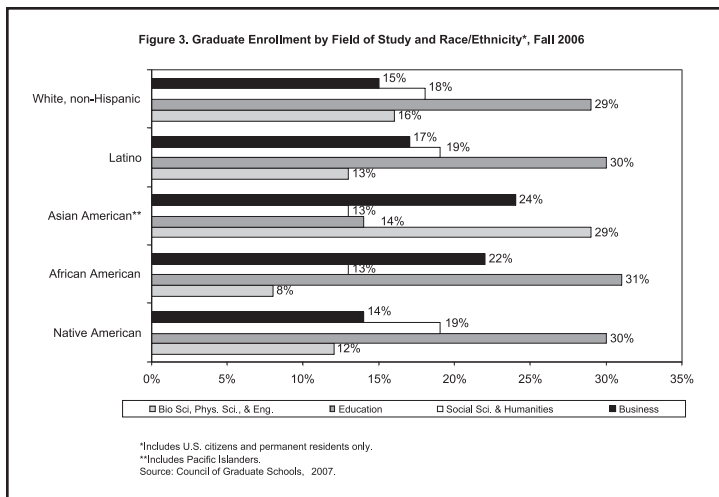
Impact of culture conflicts on assessment

PSM programs remain new and continue to be relatively poorly understood, even at many institutions that sponsor established and successful ones. The considerable variances between innovative graduate degrees such as the PSM and traditional ones can lead to tension on many levels – such "culture conflicts" have the potential to negatively impact the assessment process if evaluating experts either are unaware of the PSM-defining nature of the differences or bring pre-conceived misconceptions to the process. To guarantee familiarity with the PSM concept, we recommend that assessment teams include appropriate and objective "external authorities" (such as directors of other PSM programs, members of NPSMA, Council of Graduate Schools, and industry partners). The assessment process provides an important opportunity to educate administrators and other potential stakeholders about the PSM.

It is a wise strategy to anticipate and directly address in assessment materials those culture conflicts that may impact

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remain under-represented. In 2006, engineering, physical sciences, and biological sciences collectively accounted for only 8% of African Americans, 12% of Native Americans, and 13% of Latino graduate students, compared with 16% of White, non-Hispanics and 29% of Asian Americans (see Figure 3). In contrast, about 53% of African American graduate students, 47% of Latinos, and 44% of Native Americans were enrolled in education and business.



American graduate schools will most likely continue to become more diverse over the next decade. According to the National Center for Education Statistics (NCES, 2008), total enrollment of students in master's and doctoral programs is expected to rise 21% over the next ten years, when an estimated 2.6 million students will be seeking advanced degrees. The data from the most recent *Graduate Enrollment and Degrees* report suggests that many of these students will be members of minority groups. This increasing diversity raises a number of questions and potential challenges for graduate deans: Will funding and other resources be readily available to help support these students? Will the increased diversity affect students' perceptions about program or campus climates? What additional training or support might graduate school faculty or staff need to serve growing minority student populations? As deans respond to these and other questions regarding minority student participation, the answers may have very broad implications for the future of graduate education.

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perceptions and therefore, evaluation. PSM students can face faculty bias since they may be hard pressed to participate in many traditional academic activities; PSM students already meet extra course requirements, may be employed, or have other non-traditional demands that preclude full participation. Another commonly expressed concern is the reluctance of some academic units to embrace “outside instructors” considered both necessary and desirable for PSM “plus” courses. Unspoken expectations for PSM programs can also cloud assessment; many programs report pressure to constantly increase revenues – the expectation of an ever upward trajectory for enrollment can create a conflict between escalating quantities and maintaining quality.

PSM program directors and key faculty can face the bias that PSM-related activities are “add-ons” without concomitant respect and weight in academic evaluation processes. Moreover, many program directors report unspoken expectations that their activities will extend beyond the purview of the PSM programs. Directors may be called upon to find internships and employment opportunities for non-PSM students. There is a general perception that the directors can forge research alliances between the institution and industry. Several directors report that they are called upon to participate in institutional fund-raising, in general, and with industry in particular. While a mature and stable PSM program could well provide such benefits, most existing programs rely on one or two key personnel and are struggling to become an established facet of institutional graduate education. Perceived failure to meet additional expectations can create a less positive appraisal environment, for this reason it is important to improve institutional awareness and supporting infrastructure for PSM programs prior to assessment. We propose that PSM programs and PSM program directors have clearly articulated institutional expectations (especially important both for pre-tenure faculty members).

Conclusion

There is widespread consensus that assessment is a necessary and beneficial process for the PSM, for both summative and formative purposes. There is also consensus that evaluation of PSM programs presents a different challenge than more traditional programmatic assessments of teaching and learning, where most evaluators are academicians and have in depth understanding and familiarity with the goals and objectives. We recommend that guidelines for PSM assessment (perhaps including succinct and informative survey tools) should be created at a national level under the leadership of the National PSM Association and the Council of Graduate Schools, to promote sharing of ideas and feedback between programs. PSM programs will also need access to institutional resources and expertise for development, implementation and assessment of individual programs. Evaluation results will be valuable to all PSM

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Russel Becomes Chair of 2008 Board of Directors



William B. Russel has been dean of the Graduate School at Princeton University since 2002, the administrative home of more than 2,500 graduate students pursuing master's and doctoral degrees. The Graduate School supports nearly 40 departments and programs in all aspects of the endeavor from recruiting through graduate alumni relations, including both academic and student life responsibilities. He is also the A.W. Marks '19 Professor in the Department of Chemical Engineering, having joined the Princeton faculty in 1974, and continues to pursue research that includes the crystallization of colloidal dispersions (akin to the formation of opals), theory and fabrication of micro-patterns in thin polymer films, and the drying and cracking of paint films. He is the author or coauthor of two books, the *Dynamics of Colloidal Systems and Colloidal Dispersion* and received the American Chemical Association's "2007 Award in Colloid and Surface Chemistry."

After receiving his B.A. and M.Ch.E. degrees from Rice University and a Ph.D. from Stanford, he held a NATO Postdoctoral Fellowship in the Department of Applied Mathematics and Theoretical Physics at Cambridge University. At Princeton he has served as chairman of the Department of Chemical Engineering and director of the Princeton Materials Institute. Dean Russel is a member of the National Academy of Engineering and the American Academy of Arts and Sciences, and serves on the board of directors of the AAU Association of Graduate Schools and as chair of the Council of Graduate Schools.

DePauw Becomes Chair-Elect of 2008 Board of Directors



Karen P. DePauw is Vice Provost for Graduate Studies & Dean of the Graduate School and tenured Professor in the Departments of Sociology and Human Nutrition, Foods & Exercise at Virginia Tech. Prior to employment at Tech, she served 22 years on the faculty and as an administrator at Washington State University. The VT Graduate School supports 6500 graduate students pursuing 78 master's and 62 doctoral degrees at multiple campuses throughout Virginia and at several international locations and has administrative responsibilities for academic programs, recruitment and retention, alumni relations, fundraising, student support services and much more. She was a founding member and Facilitator/Chair for the Virginia Council of Graduate School (VCGS), serves as President of the Council of Southern Graduate Schools (CSGS) and currently serves on the Board of Directors of the Council of Graduate Schools (CGS) as Chair-elect.

Dr. DePauw is an internationally recognized scholar in the fields of adapted physical activity, disability sport and disability studies. She has published extensively (75+ books, journal articles and chapters), presented keynote and scholar lectures (more than 150) around the world focusing on inclusion and social construction of the body. She has also worked extensively in international sport science, particularly the Paralympics.

Dr. DePauw earned the A.B. in Sociology from Whittier College, M.S. in Special Education from California State University, Long Beach, and a Ph.D. in Kinesiology from Texas Woman's University. In the 1970s, she taught with the Los Angeles City and Los Angeles County Schools and California State University – Los Angeles before moving to Washington State University.

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stakeholders: students and their parents, program directors and personnel, administrators, public and private sector employers, and funding agencies.

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¹Summary of a session of the same title at the Fifth Biennial Meeting of PSM Program Leaders, November 8-9, 2007 in Arlington, VA, convened by the Council of Graduate Schools. We are indebted to our many colleagues who participated.