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# Preparing Future Faculty to Assess Undergraduate Learning: A New CGS Best Practice Initiative

Faculty in U.S. colleges and universities need to be skilled in the assessment of student learning and in the use of evidence gathered from this assessment to improve teaching and program design. Indeed, the argument can be made that, to the extent that improving the quality of U.S. higher education means improved teaching and learning, ensuring that faculty have at least a basic understanding of learning assessment is essential. Yet learning assessment is a topic to which faculty typically have little or no exposure until they begin their careers on a campus, where too often it is a responsibility delegated to campus assessment experts and/or associated primarily with accountability to regional accreditors, state boards, and other external parties. Although external stakeholders play an important role in postsecondary quality assurance, the level of faculty engagement that is key to quality improvement has been difficult to achieve where learning assessment has been perceived as more about accountability than about improvement.

To address the need for greater faculty expertise and engagement in the assessment of undergraduate student learning, CGS is launching a new, three-year initiative to develop model programs for integrating learning assessment into faculty preparation programs for graduate students. The CGS project is funded by grants from the Alfred P. Sloan Foundation to support work in STEM fields and economics, and from the Teagle Foundation to support work in the arts and sciences, with an emphasis on the humanities and qualitative social sciences fields. The project will enhance skills and understanding of future faculty in the assessment of student learning and the effective use of student learning outcomes across the disciplines.

The project will sponsor a range of activities and promising practice discussions on participating campuses and nationally. In addition, it will include a focus on special challenges in the broad fields supported by Sloan and Teagle, respectively. In science, technology, engineering, and mathematics (STEM) fields, one of the main challenges is identifying when undergraduate students are most at risk of departing from a baccalaureate STEM pathway. A focus of this project will be providing faculty with strategies to identify when students are at risk in introductory, "gateway" courses through effective learning assessment strategies and with models for responding through enhanced teaching and learning techniques. In the arts and sciences, one of the main challenges is overcoming the conviction that faculty have been left out of the discussion in defining outcomes measures. Although there are some excellent examples of learning assessment in the humanities and social sciences (Heiland and Rosenthal, 2011), some faculty in these fields have been vocal about concerns that existing models are not well suited to their disciplines. The new CGS project will meet both of these challenges through a combination of graduate school leadership and strong faculty engagement.

In the near term, the goal of the new project is to provide graduate students who aspire to faculty positions with strategies to identify needs and opportunities in their classrooms and programs, to respond to those needs and opportunities through enhanced teaching and learning techniques, and to engage with other graduate students and faculty in evidence-based conversations about assessment. A longer-term goal of the project is the enhanced integration of skills and understanding in the assessment of student learning, and in the articulation and use of student learning outcomes, into the majority of existing professional development programs to prepare graduate students for faculty careers. This article discusses the rationale for the new initiative and provides an overview of the project goals, activities, and timeline.

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#### Background

PFF programs have evolved since the time external grants first funded their development in a series of projects led by the Council of Graduate Schools in partnership with the Association of American Colleges and Universities (1993-2003). Although the core responsibilities of faculty have remained constant, programs have adapted to new technologies, new modes of delivery, and the changing demographics of higher education. A growing expectation of faculty is that they be skilled in defining and using "student learning outcomes," that is, explicit statements of generic skills and abilities and disciplinary competencies that a student is expected to have acquired as a result of successfully completing a course, a coordinated set of core courses, or other activities including co-curricular experiences.

The definition and use of student learning outcomes are now commonly required at both undergraduate and graduate levels. Clear and measurable expectations about learning can help faculty evaluate the level of student learning and engagement and develop a better sense of how a particular course or activity fits into the overall educational mission of the institution. Faculty can use outcomes assessment to reflect on their scholarly responsibilities beyond research, as teachers, and to experiment with new teaching approaches to enhance learning inside their classrooms. These outcomes can also be used by mentors, lab and program directors, and administrators to consider how programs, overall, may be best designed to provide the richest possible learning environment for undergraduates.

Student learning outcomes received little attention when universities first developed PFF programs, though the use of research on learning to inform teaching was an important part of the "scholarship of teaching and learning" paradigm that informed several PFF programs. Today, however, learning outcomes are at the center of national discussions about higher education accountability (CGS, 2011). The federal government, regional accrediting bodies, state governing boards, and the higher education community are all now calling for greater public accountability and, specifically, for greater transparency and evidence of student learning.

CGS began exploring the potential for integrating undergraduate student learning outcomes into PFF programs with a one-year, exploratory grant from the Teagle Foundation. We learned in that project, however, of the need for an expanded focus on learning assessment strategies, inclusive of but not restricted to learning outcomes. National experts in learning assessment who participated in a 2010 CGS workshop, for example, discussed a number of areas in which the Scholarship of Teaching and Learning (SOTL) might enhance graduate students' preparation to more effectively teach undergraduate students and evaluate and improve their own teaching practice. These areas included: theories of how students learn, such as "higher-order" learning, knowledge transfer, metacognitive skills; an awareness of skills that undergraduates may apply across and between disciplines, such as ethical reasoning, integrative learning, and "postformal reasoning," i.e., creativity and innovation; and knowledge of assessment technologies and tools, such as rubrics and Eportfolios (CGS, 2011a). And in all disciplines, there are specific learning outcomes that do not translate well into such generic outcomes or map well across other disciplines.

The new project builds upon three foundations:

 Evidence demonstrating a strong need for greater faculty involvement in the assessment of undergraduate student learning (especially in the humanities, where there has been strong resistance),
An increasing concern to identify effective strategies for encouraging undergraduate retention in STEM fields, and
A variety of complementary workshops and programs for current faculty and graduate students aspiring to faculty careers that have produced good results but on a limited scale.

#### **Increasing Faculty Engagement**

First, the project builds upon the results of CGS's initial Teagle-funded research to identify opportunities for integrating learning assessment and student learning outcomes into existing PFF and other, similar programs (CGS, 2011a). A survey of 47 institutions with PFF and similar programs sought information about their scope, structure, and status in order to understand the extent to which learning assessment was already integrated into the curricula. We found that the majority of programs developed in the 1990s are still active, 60% of them involve 50 or more students, and many have incorporated some learning assessment. We also found, however, that expertise in learning outcomes and assessment strategies tends to be contributed by central campus units that focus on general principles and skills rather than on discipline-specific strategies; that use of student learning outcomes is perceived by many faculty as more about compliance with accreditation requirements than genuine improvement of teaching and learning; and that most universities report that few faculty take advantage of existing opportunities to enhance skills and expertise in learning assessment. In our survey and focus group research with key stakeholders, we identified opportunities within an enhanced "PFF" model for greater faculty involvement and dialogue with graduate students about learning assessment in the disciplines where programs engage disciplinary expertise. (For a brief summary of key survey results and workshop discussion, see CGS, 2011b.)

The potential to leverage the PFF network to build assessment into the preparation of graduate students aspiring to faculty careers has been recognized as one of the key strategies for obtaining greater faculty engagement in assessment (Hutchings, 2010). We believe that reaching future faculty when they are still graduate students is the most powerful and most practical way to have an impact on future faculty values and practices.

## Using Learning Assessment as a STEM Retention Strategy

Second, the project responds to growing national concerns over challenges surrounding undergraduate retention and completion, especially in STEM fields. There is an emerging body of knowledge about classroom strategies, teaching behaviors and pedagogical techniques that support undergraduate student retention (e.g., Seymour & Hewitt, 1997, Brown et al., 2009; Tilghman 2010; AAU, 2011). Comparative international data on undergraduate STEM majors suggest, however, that greater integration and application of this knowledge in U.S. classrooms is needed. According to a recent report by the OECD, the U.S. ranked 27 among 29 developed countries in undergraduate STEM majors, as STEM majors make up fewer than 16% of U.S. baccalaureates (NSF 2010, appendix table 2-13). A recent New York Times article, "Why Science Majors Change Their Minds," notes: while the number of college freshman majors in STEM is growing, "[s]tudies have



found that roughly 40 percent of students planning engineering and science majors end up switching to other subjects or failing to get any degree" (Drew, 2011). The retention problem is further exacerbated by the low probability of recruiting students who had not already considered majoring in a STEM field. The result of such low undergraduate participation in STEM fields is a dearth of qualified domestic students moving into and through the graduate pipeline and/or into the STEM workforce.

National calls for higher education reform to confront this challenge focus on multiple needs: to restructure pathways and reform curricula in ways that would encourage more undergraduate students to pursue STEM majors, to cultivate new skills for the future STEM workforce through curricular and institutional reform, and for doctoral programs to provide better professional development for future faculty (AAU, 2011; CGS/ETS, 2010; Tilghman, 2010). Science faculty, educational researchers, and universities have studied the impact of interventions on retention and recruitment, including reforms in "gateway" and introductory courses. Traditionally, such courses tend to be large and anonymous, with little opportunity for interaction. They have also been criticized for focusing on abstract knowledge and memorization, and for employing norm-based grading (on a "curve") that can wash out some of the most promising students. Some successful strategies have been identified (see Brown et al., 2009; Tilghman, 2010; Johns Hopkins, 2011). Broad diffusion of these strategies throughout college STEM education, however, is yet to be achieved on a scale that would make an impact on the pipeline or the overall quality of U.S. STEM education.

#### Building on Existing Professional Development Programs

Third, the project builds upon the work of existing professional development programs for current faculty and graduate students aspiring to faculty positions. These include: active PFF and similar programs, the NSFfunded Center for Integration of Research, Teaching and Learning (CIRTL) project to prepare future faculty to develop and use effective teaching practices with the overall mission of improving undergraduate education in STEM; the Higher Learning Commission's "Academy for Assessment of Student Learning"; faculty workshops offered by regional accreditors on the use of student learning outcomes; and a range of initiatives by organizations such as the Lumina Foundation, the Association of American Colleges and Universities, the Association of Public Land-Grant Universities, and the Association of American Universities (http://www.nchalc.org; Provezis 2011; APLU 2011). Despite the proliferation of faculty workshops and strong calls from accrediting bodies for improved use of student learning outcomes, however, our survey results suggest that many new faculty have received little or no systematic exposure to outcomes assessment (CGS 2011).

The new CGS project builds upon a track record of successful graduate change initiatives, led by graduate deans and graduate schools, that have engaged faculty and future faculty in Best Practice solutions. A recent AAU paper notes: "The challenge ... is not figuring out what works. The challenge is to persuade faculty members, who want to be good teachers, to implement these practices in their own classes" (AAU, 2011). The project seeks to effect broader culture change by embedding preparation in learning assessment into graduate education under the direction of graduate schools and graduate deans. With their oversight responsibilities for program assessment and review, and their unique role in collecting and using data to promote broader adoption of practices that work across the disciplines, graduate deans and graduate schools are advantageously positioned to lead in the professional development of future faculty in a project that will benefit U.S. higher education more broadly.

#### **Project Details and Timeline**

CGS will issue a request for proposals in April 2012 announcing "advance grants" of \$50,000 that will invite universities with strong expertise in learning assessment and existing programs to prepare graduate students for faculty roles and responsibilities. These grants will support the development and evaluation of innovative approaches to integrating learning assessment into these programs and participant leadership in national discussions about best practices and lessons learned. We anticipate the RFP will build on action areas identified in the 2010 workshop as areas of priority consideration:

(1) Link assessment to research and scholarship

(2) Reframe the concepts of teaching and learning

(3) Use data to demonstrate the impact of assessment

(4) Create opportunities for faculty ownership and leadership(5) Develop and improve incentives for faculty and student involvement, and(6) Connect assessment to professional success.

Universities will be required to demonstrate how the proposed project leverages existing activities in arts and sciences and/or STEM learning assessment and the expected impact of the project on numbers of students during and beyond the duration of the sub-award. They will also be required to identify a subset of STEM and arts and science disciplines in which strong faculty support for the goals of the project exists, and where promising practices can be scaled up and/or are most needed. A technical workshop held in conjunction with the CGS Summer Workshop in July, and a webinar shortly thereafter, will focus on strategies for shaping successful proposals. Proposals will be due in September. Five universities will be selected to commence projects in November 2012.

#### Conclusion

PFF and other, similar professional development programs for graduate students aspiring to faculty careers provide an ideal opportunity for introducing graduate students to the institutional expectations for learning assessment, skills and techniques in assessment, and broader issues about how and why student learning should be assessed as well as how results can be used to improve teaching and curricula. If the project is successful, it will create a cadre of future faculty champions of disciplinerelevant learning assessment who will diffuse innovations in their subsequent faculty careers, both as teachers of undergraduate students and as graduate faculty who set expectations for the professional development of their own graduate students.

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# Data Sources: A Profile of McNair Scholars

The Ronald E. McNair Post-Baccalaureate Achievement Program, also known as the McNair Scholars Program, is the largest federal effort aimed at preparing lowincome, first-generation in college and minority undergraduates to pursue doctoral studies. The McNair Scholars Program is funded through the U.S. Department of Education's TRIO programs and provides participants with research internships, faculty mentors, opportunities to present and publish results of their research, undergraduate teaching experience, and assistance with applying to and preparing for graduate school.

McNair Scholars represent a diverse pool of prospective graduate students, including students who are traditionally underrepresented at all levels of higher education. According to the U.S. Department of Education, about seven out of ten McNair Scholars (71%) are low-income and firstgeneration college students (U.S. Department of Education, 2007). In addition, seven out of ten McNair Scholars are underrepresented minorities. In 2004-05, the latest year for which data are available, about 43% of McNair Scholars were Black/African American, about 24% were Hispanic/Latino, and approximately 3% were American Indian/Alaska Native. That same year, more than two-thirds (68%) of all McNair Scholars were female, a percentage that has gradually increased over time, up from about 65% in 1997-98 (U.S. Department of Education, 2005; U.S. Department of Education, 2007).

While the Department of Education has reported on the demographic characteristics of McNair Scholars, to date the Department has not released any data on McNair Scholars by field of study. However, this information can be gleaned from the annual McNair Scholars Directory. Conducted under the auspices of the CGS/COE Joint McNair Committee, the McNair Scholars Directory is a collaborative effort of the Council of Graduate Schools and the Council for Opportunity in Education. The directory is designed to provide graduate schools with access to McNair Scholars who have expressed an interest in pursuing graduate studies in order to facilitate the recruitment of these highly talented individuals into graduate school. The directory contains records of recent graduates, seniors, and rising seniors, with McNair Scholars' names,

contact information, undergraduate majors, areas of interest for graduate study, and undergraduate research projects. More than four out of five (84%) McNair Scholars Programs provided information for the 2011–12 McNair Scholars directory; roughly 3,300 McNair Scholars are included in the Directory. (The password-protected Directory is available for download from COE's website, http://www.coenet.us.)

McNair Scholars are more than twice as likely than all undergraduates to be pursuing a degree in STEM.

Among the McNair Scholars included in the 2011–12 McNair Scholars Directory, twothirds are enrolled in science, technology, engineering, and mathematics (STEM) fields at the undergraduate level (Council for Opportunity in Education, 2011). As shown in Figure 1, 30% are enrolled in science and engineering fields, and 37% are in social and behavioral sciences at the undergraduate level. About one in ten McNair Scholars are pursuing a degree in arts and humanities.

The enrollment of McNair Scholars by field of study differs substantially from overall

undergraduate enrollment. While two-thirds of McNair Scholars are in STEM fields, only about three out of ten undergraduates at four-year institutions in the United States are majoring in STEM fields (including social sciences), indicating that McNair Scholars are more than twice as likely than all undergraduates to be pursuing a degree in STEM (Snyder & Dillow, 2011).

As shown in Figure 2, similar but slightly smaller percentages of the McNair Scholars included in the 2011–12 McNair Scholars Directory indicated that their primary area of interest for graduate study was in STEM (Council for Opportunity in Education, 2011). Some 28% of McNair Scholars intend to enroll in science and engineering at the graduate level, and one-third (34%) plan to pursue a graduate degree in social and behavioral sciences. Arts and humanities and health sciences each account for about one out of ten McNair Scholars.

While the data on outcomes for McNair Scholars are incomplete, the available data do indicate that the bachelor's degree attainment rate of McNair Scholars is very high. Among active McNair Scholars in 1997–98, 95% of these students completed their bachelor's degree by 2001–02 (U.S. Department of Education, 2005). Overall at the bachelor's level, only about 57% of all first-time, full-time students at four-year institutions complete a bachelor's degree within six years (Knapp, Kelly-Reid, & Ginder, 2011). While there is not a direct comparison between these two statistics, it does illustrate







the high success rate of McNair Scholars in completing their undergraduate degrees.

The available data also suggest that McNair Scholars have high graduate enrollment rates. Among McNair Scholars who graduated in 2006–07, more than onehalf (53%) were enrolled in graduate school in 2007–08, the academic year immediately after receipt of the baccalaureate (U.S. Department of Education, 2012). The outcomes data from earlier cohorts suggest that even more of the 2006-07 McNair Scholars enrolled in graduate school two or more years after receipt of the baccalaureate (U.S. Department of Education, 2005). There is also some evidence to suggest that McNair Scholars are more likely to enroll in graduate school in the year after graduation than their demographically similar non-McNair peers. However, this analysis is limited by some missing and invalid data, and in some cases from inconsistencies in the way that questions were asked from year to year (U.S. Department of Education, 2005).

#### Discussion

Overall, McNair Scholars are more likely to be from populations that are underrepresented in graduate education and are likely to be majoring in STEM fields. Additionally, McNair Scholars are receiving the preparation to enable them to succeed at the graduate level, making this population of talented students an important focus for graduate school recruitment. As stated in the 2010 report, *The Path Forward*, the global competitiveness of the United States and our capacity for innovation hinge fundamentally on our ability to produce sufficient numbers of graduate degree-holders to meet future workforce demands, and key to accomplishing this is increasing the numbers of underrepresented students entering, and completing, graduate studies (Wendler et al., 2010). The goal of the McNair Scholars program is to do just that.

Despite having some data about the characteristics of McNair Scholars, their undergraduate degree attainment rates, and their immediate graduate school enrollment rates, an examination of outcomes for McNair Scholars is constrained by a lack of sufficient data. We know nothing about the outcomes for McNair Scholars who completed their undergraduate degrees within the past five years, even though this information is reported annually by the McNair Scholars Programs to the U.S. Department of Education. For the earlier cohorts, we lack sufficient data to reveal the eventual doctoral degree attainment rates for McNair Scholars, as well as other types of advanced degrees they may have earned, such as master's degrees and firstprofessional degrees. These data, along with information on career outcomes, would provide a much more comprehensive picture of the impact of the McNair Scholars Program. A more robust, longer term study, including a study of a comparison group of low income, first generation undergraduates who did not participate in the McNair Scholars Program, would reveal more complete information about outcomes for McNair Scholars.

By Nathan E. Bell, Director, Research and Policy Analysis, Council of Graduate Schools

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## Registration is Now Open!





# Selection of Institutional Research Partners for the CGS Doctoral Initiative on Minority Attrition and Completion

The Council of Graduate Schools (CGS) has been awarded a 3-year grant from the National Science Foundation (NSF) (grant # 1138814) to examine completion and attrition among underrepresented minorities in STEM doctoral programs. The project, referred to as CGS's Doctoral Initiative on Minority Attrition and Completion (DIMAC), will examine qualitative and quantitative data across a diverse set of institutions, including some that have been funded by NSF's Alliances for Graduate Education and the Professoriate (AGEP) program. The purpose of this research is to better understand the factors that promote successful completion and the policies and practices that hold promise for increasing completion and reducing attrition.

A portion of the nearly \$1.5 million grant will be used to provide sub-awards to fund 20 proposals from CGS member institutions. Through a recently completed competitive process, which included the recommendation of an independent committee, 20 proposals were selected for funding of up to \$30,000 each. One of these proposals involved a consortium of two institutions; therefore, 21 institutions were selected to participate as CGS Research Partners in the project. The Research Partners selected are:

Brown University	University of California, San Diego
Drexel University	University of Central Florida
Florida International University	University of Georgia
Florida State University	University of Illinois-Urbana Champaign
Loyola University Chicago	University of Iowa
New Mexico State University	University of Maryland, Baltimore County
North Carolina State University	University of Mississippi/Mississippi State University (joint proposal)
Northwestern University	University of Missouri-Columbia
Princeton University	University of South Florida
Texas A & M University	University of California, Irvine

These 21 Research Partners will:

Collect and report completion and attrition data for all underrepresented minority students entering STEM doctoral programs in academic years 1992-93 through 2011-12.

Describe program characteristics and policies, practices, and interventions that might impact completion and attrition for all STEM doctoral programs offered by the institution.

Field a web-based student survey, developed by CGS, covering a set of topics addressing completion and attrition in STEM doctoral programs.

Host a two-day site visit for CGS project staff to conduct focus groups with students and interviews with graduate deans, faculty and other university personnel.

Highlight the institution's participation in this effort by taking part in national discussions on the topic of doctoral completion (e.g., at CGS Annual Meetings and/or Summer Workshop sessions).

The projected release date of the study's findings is summer 2014.



### PFF to Assess Undergraduate Learning (continued from page three)

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## New Members

Associate:

## BryanLGH College of Health Sciences

International:

Abu Dhabi University

Hong Kong University of Science and Technology

National University of Singapore

## New Deans and Titles

R. Scott Beard is Dean, Graduate Studies and Continuing Education at Shepherd University. He replaces Russell Porter.

Debra Boyd is Vice President for Academic Affairs and Acting Dean, Graduate School at Winthrop University. She replaces Yvonne Murnane.

Lacy K. Ford, Jr. is Vice Provost and Dean, Graduate School at the University of South Carolina. He replaces Timothy Mousseau.

Diane J. Guido is Vice Provost for Graduate Programs at Azusa Pacific University. She replaces Michael Whyte.

Manfred Malzahn is Director of Research and Graduate Studies Support at United Arab Emirates University. He replaces Donald Bowen.

Robert Zierolf is Interim Vice Provost and Dean of the Graduate School at the University of Cincinnati. He replaces Neville Pinto.

