Building a Comprehensive Assessment Model for Combined WISE & MSEP Programs

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Abstract-- The merging of Women in Science and Engineering Programs and Minority in Science and Engineering Programs (WISE & MSEP) is becoming increasingly common among WEPAN and NAMEPA member campuses. WISE and MSEP programs have unique cultures (norms, process and practices) which influence how they are assessed by their respective program directors and college organizations. The University of Washington recently merged its WISE and MSEP programs and sought to learn more about assessment models from other WEPAN member campuses. Authors review the literature on assessment and report on discussions about assessment with merged and distinct programs. Findings from discussions with merged programs are used to propose guidelines for developing a comprehensive assessment plan for merged programs.

Introduction

The first joint conference between the Women in Engineering Program Advocates Network (WEPAN) and the National Association of Minority Engineering Program Administrators (NAMEPA) was held in 1997. Prior to that first collaborative effort, the two organizations co-existed with similar missions for many years. Differences in their target populations and campus organizational structures did not facilitate extensive collaboration either nationally or on individual campuses. Since 1997, however, a number of higher education institutions have begun to blend organizational structures and target populations to address the lack of women and minorities in science, technology, engineering and mathematics (STEM). These institutional changes have been fueled primarily by the following changes in higher education and the STEM community:

- Challenges to affirmative action have caused higher education and industry to now focus on diversity broadly defined instead of as distinctly gender or race (Caperton, 2004; Malcolm, Chubin, & Jesse, 2004).
- A volatile national economy has translated into industry insistence on increasing the return on its investment in higher education diversity broadly defined (Schmidt, 2000)
- A national crisis focused on the need for more diversity (broadly defined) in the STEM workforce (Jackson, 2002).

- Declining resources for higher education at the state and national level has decreased the amount of funds available for student support and diversity programs on college campuses (Marcy, 2003).

These changes have placed increased pressure on gender and race-related programs to be more collaborative and assess the impact that their programs make in contributing to diversity in the STEM workforce. In 2003, the University of Washington (UW) decided to merge its student services, MSEP and WISE programs into one organization – the Office of Diversity and Student Services. One of the primary tasks for the new director is the development of an assessment plan for the merged entity. Working with the Center for Workforce Development, the director sought to learn more about national models for assessing merged women and minority science and engineering programs.

In the discussion which follows, the authors review the literature on assessment, discuss the UW merged model, report on discussions with other programs about assessment, and propose guidelines for developing a comprehensive assessment plan for merged programs.

A Conceptual Framework for Assessment in WISE & MSEP Programs

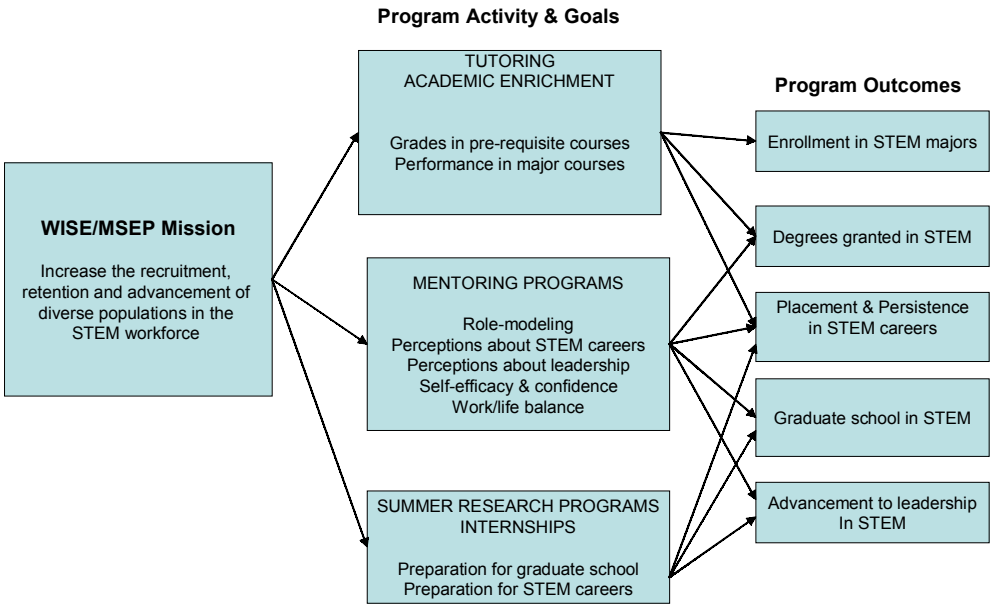
Assessment of programs – whether gender or race related – has been an ongoing issue for gender and race-related programs even when they were distinct entities. In its work documenting best practices for broadening participation in science, technology, engineering and mathematics (STEM), the Building Engineering & Science Talent project (BEST) identified the lack of assessment and the absence of documentation on program outcomes as major issues for the programs they inventoried (BEST, 2004).

Rather than uniformly asserting that WISE and MSEP programs have not been engaged in assessment, it is more likely that programs have focused on formative program evaluation rather than summative evaluation or assessment. Formative evaluation, also known as utility assessment, implementation or process evaluation, focuses on issues related to program implementation and quality (Daniels, 1996; Frechtling, 2002; Frechtling & Sharp, 1997; Jacobi, Astin, & Ayala, 1987; Rossi & Freeman, 1993). Formative evaluation seeks to know if the program is reaching the intended population in an effective manner. Information from formative evaluation is most often used to monitor and improve programs. In contrast, summative evaluation or assessment focuses on the impact of the program on the larger organizational mission and goals. It seeks to know more about outcomes or how the mission of the organization has been impacted as a result of program activity.

While there is considerable overlap between formative program evaluation and assessment, there are important differences in approaches and conceptual frameworks. For example a formative evaluation of a tutoring program might ask questions about the quality of the tutor, the administration of the program or grades earned by program participants. A summative assessment would ask questions about the impact that the tutoring program had on increasing the number of students enrolling in STEM majors or proceeding to graduate school. In other words, assessment requires that program administrators think about why they have a tutoring program

and how the program contributes to the overall mission of the organization. Outcomes are the standards by which programmatic contributions to mission are measured.
A conceptual framework for the assessment of WISE and MSEP initiatives might look like that shown in Figure 1 below. The framework relates mission to program activity and goals, and proposes program outcomes that might be appropriate given the organizational mission. While the individual components may vary by institution, this framework suggests that the outcomes to be measured (i.e., enrollment in STEM majors) are better standards for making judgments about program impact rather than how well a specific tutor provided assistance to a program participant.

Figure 1: Conceptual Framework for Assessment of WISE & MSEP Initiatives



Since the institutional components vary, the UW sought information about how other programs conceptualize assessment in an effort to develop a new model for assessing its programs.

Assessment on Other Campuses

In early December 2004 an email was sent to the WEPAN-listserve to determine how many WISE/MSEP programs have been merged and if an evaluation model or procedure was used. The two questions posed were:

1) Which institutions have an independent WISE/MSEP or WIE/MEP programs, and if so who does the assessment/evaluation of the programs?;
2) Which institutions have merged their WISE/MSEP or WIE/MEP programs, and if so who does the evaluations of their programs?

Twenty-four (24) responses were received. Of these, eight institutions had merged MSEP/WISE programs, and three were considering merging. A series of follow-up questions were then sent

to the eight merged programs requesting more information on the types of evaluations that were conducted. The questions posed were as follows.

1. Do you conduct both formative and summative evaluations of your program? If so please list both the formative and summative instruments that you use. If so, how long have you been doing it? Are there specific times during the year?
2. Do you track students individually from entry into college to exit point or graduation? If so, how do you do that?
3. Do you track graduating students to first employment?
4. Do you track retention rates on an annual basis?
5. What are your measures of success, e.g., increase in enrollments and degrees granted, disaggregated by gender and ethnicity?

All of the eight merged programs indicated that they conduct formative evaluation, and three of those programs also track female students each year to determine graduation rates. Two programs were so recently merged that they discussed their evaluation plans and they are interested in effective models for conducting formative and summative evaluation, with particular interest in measuring the impact of the mergers on student retention.

Responses and follow-up conversations with program directors of the eight merged programs confirmed that most programs are conducting formative evaluation rather than outcome based assessment. None indicated that they use standardized instruments, with most using instruments developed in-house specifically for the program's use.

Measures of success reported by the eight merged programs include: increases in enrollments and degrees granted (disaggregated by race and gender), retention from the first year to the sophomore year, and retention on an annual basis using cohort data.

Toward a Comprehensive Model at the UW

Despite the information gathered from other institutions, it was quickly apparent that a comprehensive model for assessing merged programs does not exist. Thus, the UW staff set out to develop a model using internal expertise and the discussions with other programs as a foundation. Understanding the history of the WISE and MSEP programs at UW is a critical part of developing the new assessment model.

For almost twenty years the MSEP and WISE offices have acted quite independently within the College of Engineering (COE). At the UW the student organizations, the Society of Women Engineers, National Society of Black Engineers, Society of Hispanic Professional Engineers, American Indian Science and Engineering Society, also operate independently with support from the College of Engineering. With the exception of NSBE the student organizations have COE staff members as advisors. MSEP staff and facilities are hosted in two separate buildings on different floors in close proximity to each other. WISE staff and facilities are located in a building on a different part of campus.

MSEP is focused on providing assistance and opportunities to minority students. The program pursues a strategic plan that starts with community partnerships and culminates with job placement assistance. MSEP has a retention strategy for students that starts with pre-freshmen and extends through second year for underrepresented students. The objective is to increase students' success at gaining admission to academic departments and persisting to graduation. A considerable amount of effort focuses on increasing the number of underrepresented students utilizing MSEP services to improve grades in 'gate keeper' or pre-requisite STEM courses. Specifically, MSEP provides the following services: scholarships and financial assistance, counseling/advising, problem solving workshops, tutoring, pre-freshmen summer internships (Alliance for Learning and Vision for underrepresented Americans), Bridge (one-week pre-freshmen orientation), Study Center, Computer Learning Center, motivational talks.

The WISE program has offered programs to students and conducted research on women in STEM since its inception in 1988 as the Women in Engineering Initiative. Programs offered include fellowships and scholarships, pre-major academic enrichment through tutoring and seminars during the freshman and sophomore years, peer mentoring, mentoring by faculty and STEM professionals, and professional development seminars for students during their junior and senior year. All programs focus on encouraging more women students to consider STEM careers by offering mentoring, seminars and academic support. These programmatic efforts resulted in the development of a nationally recognized mentoring curriculum. WISE research initiatives include a longitudinal study of undergraduate women in STEM (Brainard & Carlin, 1998; Huang & Brainard, 2001), undergraduate and graduate climate studies (Brainard, Metz, & Gillmore, 1999; Litzler, Edwards Lange, & Brainard, 2005b) and a career outcomes study (Litzler, Edwards Lange, & Brainard, 2005a).

As noted earlier, the services provided separately by WISE and MSEP are currently under the umbrella of the Office of Diversity and Student Services. The Director is responsible for the overall management of programs designed to recruit, retain and support outstanding and diverse pools of undergraduate and graduate students in STEM. Under the new merged model the WISE pre-major program will be continued and enhanced by sharing academic support resources that were dedicated for MSEP students. Additionally, the WISE mentoring program will be extended to include the MSEP student population.

To ensure that the restructuring plan can continue to provide quality services and meet diversity goals while being financially reasonable and sustainable, the Diversity and Student Services leadership must develop a comprehensive strategic plan. This broad and far reaching plan will include the following efforts related to assessment:

- Development of metrics to ensure that the diversity and student service programs are addressing and making progress on objectives.
- Implementation of standardized formative evaluation for all programs offered.
- Collaboration on the design and implementation of a database system for the purpose of tracking student progress, evaluating and assessing the program's achievements and responding to the reporting requirements of various grants.
- Tightening of the link between formative evaluation results and mission-related outcomes.

- Development of a reporting and communication strategy in conjunction with program mission and objectives. The reporting strategy will include methods to disseminate findings on an annual basis, and an external advisory body to help with the establishment of goals and strategies for continuous improvement.

Guidelines for Developing a Comprehensive Model

Assessment is not easy by any means. It takes concentrated effort and a commitment to use the results for change. It also requires that program staff constantly question why they do what they do and if they should continue doing it. This can be very threatening for program staff and students who are already concerned about how the combined programs will impact them. Implementing an assessment model should be done with buy-in and involvement of all parties. Constant reinforcement that assessment will be used for program improvement rather than punitive purposes will do much to ease student and staff apprehension.

The following guidelines are offered to program administrators considering assessment in addition to formative program evaluations. Most are based on assessment research on higher education institutions (Jacobi et al., 1987; Palomba & Banta, 1999).

- *Develop a standard method for identifying and tracking program participants.*
  The identification of students with an interest in STEM at the point of entry to the university is critical. The pool of interested students serves as fertile grounds for recruiting program participants. Further, students with an interest in STEM who do not participate in WISE or MSEP programs serve as an excellent comparison group for examining outcomes. Standardize how retention will be measured and reported for the entire pool of interested students compared to WISE and MSEP participants.

- *Reach agreement on shared goals and objectives for programmatic activities, and determine formative evaluation activities that speak to them.*
  When possible, all program activities should be offered to both women and underrepresented students. The shared goal of preparation for STEM careers dictates that all students have access to the same programmatic activities. After common program activity has been implemented develop methods for evaluating how the program is administered, as well as its perceived utility and effectiveness.

- *Develop clear and measurable outcomes related to organizational mission*
  Program activity should be linked with organizational mission and staff should be cognizant of what would be different for students and the campus as a result of program activity. Where applicable, incorporate the student outcomes delineated by accreditation boards such as ABET (Accreditation Board for Engineering and Technology, 2005) into WISE and MSEP program outcomes. The outcomes listed in Figure 1 are a good starting place, but they must be tailored to institutional settings and priorities.

- *Select and/or design instruments and data collection methods appropriate to outcomes in order to benchmark progress.*

Standardized instruments and data collection methods can reduce bias and ensure that results accurately reflect the metric of interest. Data collection should include timelines for administering instruments, as well as short and long-term benchmarks to appraise findings.

- *Involve individuals from all perspectives in assessment activity (students, faculty, advisory board members, donors, alumni, and staff).*
  Diverse perspectives can enhance program activity and aid in the interpretation of outcome data. Quantitative data without qualitative input from program stakeholders can be misleading or incomplete. Feedback from a variety of individuals ensures that staff members do not become insular in their thinking or approaches to program delivery.

- *Analyze findings and share reports with appropriate audiences. Use assessment findings and reports to make budget, program planning and staffing decisions.*
  Dissemination of findings can be a powerful way to gain additional resources for programs, particularly if the data shows significant differences in outcomes for students who use program services compared to those who do not. When data is not favorable, sharing it can be an opportunity to gain insight on how to modify program activity or implementation strategies.

- *Regularly examine the assessment model and revise activity.*
  The world in which STEM graduates will work is changing constantly. Programs that are not reflective about their activity and assessment model will run the risk of becoming obsolete.

In closing, the merged program model at the University of Washington offers program staff an opportunity to reflect on its history and strategize for its future. A comprehensive assessment model will be at the center of the new structure and help in shaping the collective future of WISE and MSEP initiatives.

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