

FACT FINDING: WHAT ARE THE NEEDS AND WHAT IS WORKING?

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The Washington State University (WSU) Committee on Women in Math, Science and Engineering was founded in 1989 as an ad hoc committee of faculty and graduate students concerned about the under representation of women in the sciences, engineering and mathematics (SEM). The primary focus of the committee has been freshmen women expressing an interest in SEM, but efforts have been made to serve all undergraduate women, graduate students, and faculty in SEM. Most of the programs are inclusive and benefit men as well as women. The Committee has student, faculty and staff representation from the College of Sciences, the College of Engineering and Architecture, the Women in Engineering Program, Residence Life (the campus unit responsible for staffing and programming within the residence halls), the Student Advising and Learning Center, and the Women's Resource Center. Financial support for the Committee comes from the Dean of the College of Engineering and Architecture, the Dean of the College of Sciences, and the Coalition for Women Students.

WSU is the land-grant university of Washington State and is one of the largest residential campuses west of the Mississippi River. Current enrollment stands at 16,737 students, 2024 of which are graduate students. The ratio of men to women students in SEM at WSU is approximately 2:1 as compared to the national ratio of 3:1.

MISSION

The mission of the Committee on Women in Math, Science and Engineering is to understand the issues of recruitment and retention of women in academic disciplines falling under the broad umbrella of science, engineering and mathematics and to use that information to initiate, develop, and coordinate programs that support the success of women students at WSU in these areas. This Committee seeks to accomplish its mission by following the pertinent literature, conducting research at WSU and developing and/or collaborating on programs and services that support a comfortable, academically supportive and encouraging atmosphere leading to the success of women in SEM. Most of the services developed and implemented benefit all students regardless of gender.

NEEDS

The studies at WSU have produced results that are either consistent with what is found in the literature or expand upon those findings. The importance of the research lies in understanding the problems and needs of the students being supported. Below is a summary of the needs that have been identified here at WSU.

- Cooperative rather than competitive atmosphere
- Clustering women in classes to avoid isolation

- Realistic expectations of grades in entry-level courses
- Regular interactions with faculty members and fellow students
- Better or different instructional styles in entry-level classes
- The time and place to study without distractions
- Thorough advising and readily available assistance for academic problems
- Study skills suitable for success at the university

PROGRAMS AND SERVICES

The following are some of the programs and services in place at WSU that were designed to meet the needs outlined above.

Math, Science and Engineering (MS&E) Residence Hall Project

The MS&E Residence Hall was initiated by the Committee in an effort to promote an academic/social network that supports the goals of women in SEM. The model for the hall was the Douglass Project at Rutgers and as such the original concept was to have a program focused entirely on women, but through student input it evolved into the co-educational project of today. Benefits for the students in the project include the following.

- The support of living with others who share common interests and ambitions
- Being surrounded by potential study partners and role models who are further along academically
- In-hall programs and resources designed specifically for students interested in math, science and engineering
- A state-of-the-art computer lab located in the hall and equipped with the software widely used in science, engineering and math classes
- Tutor-assisted study hall located in the hall
- Access to drafting tables
- Study/meeting rooms on each floor
- Resident advisors, most of whom are science, engineering or math majors

A brief history of the project illustrating the rapid growth is summarized in the table below.

Academic Year	Residence Hall	# female residents	# male residents
1991-1992	Stephenson North	25	25
1992-1993	Orton	90	170
1993-1994	Goldsworthy	80	200
1994-1995	Gannon/Goldsworthy	128	284
1995-1996	Gannon/Goldsworthy	142	326

Science, Engineering and Math Advising Fair

The Fair was a new initiative in Spring 1995 and will continue to be held each spring two weeks prior to pre-registration. It is an opportunity for SEM students to get information that is not readily available from their advisors. This includes, but is not limited to the following.

- Details about courses outside the advisor's department
- Majors or minors in other departments

- Student clubs/scholarships/career opportunities
- Research and work opportunities within departments
- Information on the Honors Program, International Studies, Career Services and Service Learning

Study Hall

The Committee coordinates a study hall located in the MS&E Residence Hall lobby. Tutors are available Sunday-Thursday evenings from 6:30 p.m.-9:30 p.m. to help with entry level mathematics, physics and biology courses that are mainly populated by SEM majors.

Other

The Committee maintains a resource collection of books, bulletins, magazines and articles on issues related to women in SEM. It produces a directory of women mathematicians, scientists and engineers in Washington State that is designed to enhance the connections between women in these fields. Students use it to contact women for information about internships, careers and employers; organizations use it to identify speakers for programs designed to support and encourage women; and professional women use it to find and maintain connections with other women in their fields. The Committee also works with the undergraduate group *Women in Technology and Science* and the Palouse Chapter of the *Association of Women in Science* to bring women to campus for public lectures and the opportunity to meet informally with women students and faculty in SEM.

The Committee monitors retention rates, graduation rates and general satisfaction of students in SEM at WSU. It also conducts research aimed at understanding the factors contributing to persistence and attrition in these fields.

WHAT WORKS

From different forms of assessment that have been done to date, the following programs or approaches seem to have a positive effect.

MS&E Residence Hall

Several pieces of data point to the success of the MS&E Hall; the participation has grown every year, in-hall surveys and interviews indicate a general satisfaction with the hall and the support programs, and the number of students electing to return to the hall increases each year.

Academic Support within the Hall (study hall, computer lab, freshman seminar)

The in-hall surveys and interviews highlighted the fact that students appreciated and valued this support. Approximately 150-200 students took advantage of the study hall each week and the computer lab was often full, especially during the evening hours. The freshman seminar was a new offering this past fall and students requested that the weekly study group associated with the seminar continue into the spring semester.

Mentors in Student's Fields (upper class residents, resident advisors, peer tutors, Sisters in Science)

Surveys and interviews indicate that mentors are an influential factor in students lives. Also, programs such as the Sisters in Science Program which links freshmen and sophomore women with juniors and seniors in a closely related discipline have good participation.

General Advising before Official Advising

The two Advising Fairs have had good attendance in spite of conflicts with other popular events such as the NCAA finals. The evaluations from the Fairs have been overwhelmingly positive.

Student Input to Planning and Programs

Experience has shown that much better success is achieved when students are actively involved in the planning and production of programs. Some programs which have been planned and produced by the Committee have been monumental failures. Student involvement guarantees that the program will be of interest to students and, furthermore, the student volunteers are very effective at recruiting friends and neighbors.

Personal Invitations to Events

Students respond well to a personal invitation to a program from a friend, professor or mentor. Personal invitations are particularly effective as a supplement to posted flyers and written invitations.

Interviews with Students in Addition to Written Surveys

The same general questions can be asked on written surveys and in interviews, however, the information gleaned from an interview is often richer in detail and identifies specifics that would have been missed by the written survey. The time required for a few interviews as a complement to a detailed written survey can be very beneficial.

WHAT DOES NOT WORK

Gender Exclusive Programs

In the co-educational environment here at WSU, women students have resisted certain gender exclusive programs. For example, they were adamant about maintaining the MS&E Hall as a co-educational hall using the argument that any familiar face in class is welcome regardless of gender. However, smaller gender exclusive initiatives such as the Sisters in Science mentoring program have had success.

Locating Non-SEM Students in the MS&E Hall

During the rapid growth period for the MS&E Hall, extra space was filled by non-SEM students which had a disruptive influence on the morale and community environment. The non-SEM students felt slighted since most of the in-hall programming was designed for SEM students and conduct problems increased as a result.

Doing Too Many Surveys at One Time

The students have certain periods of time when they are bombarded by questionnaires and surveys. The results are poor response rates and incomplete surveys which have to be omitted.

Not Planning Assessments Ahead of Time

Assessment needs to be part of the initial planning of a program because some forms of data are lost forever when not collected in advance. Also data collected in an ad hoc manner tends to be incomplete and can be inaccurate and confusing to obtain and sort out.

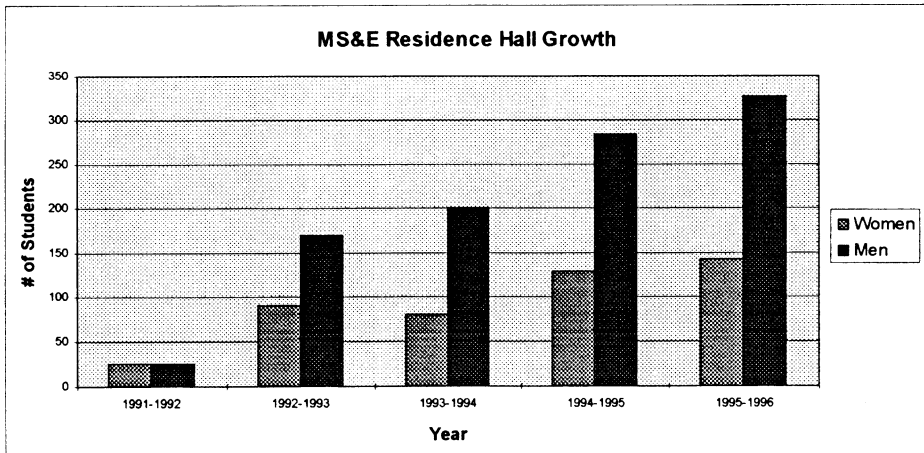
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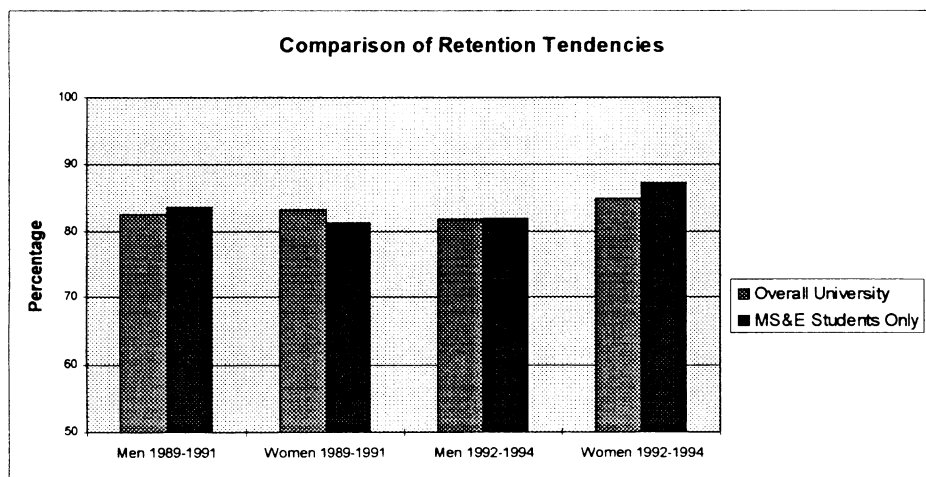
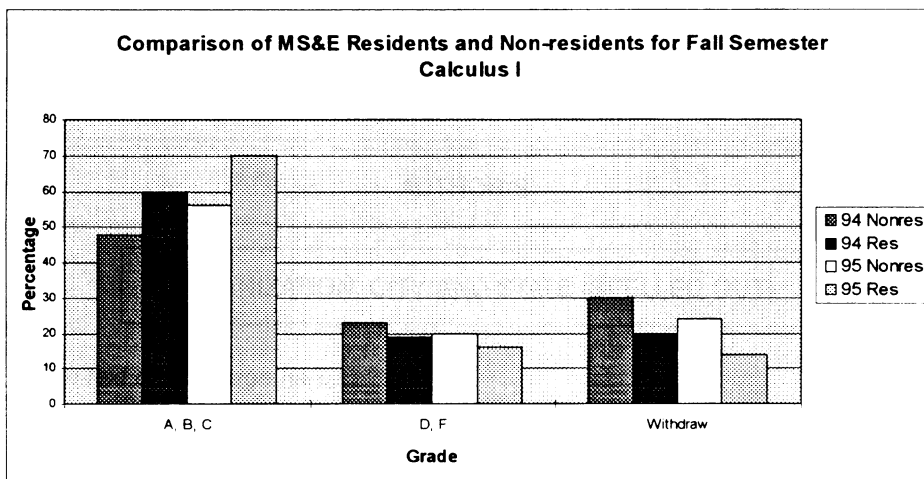
A critical component of any good program is careful assessment. When planned in advance, assessments can be easy to obtain and of fundamental importance to funding decisions. Assessment measures can promote the program virtues through a balance of both quantitative and qualitative outcomes. Qualitative data collected in a small random sample of the individuals who take the quantitative surveys can clarify responses. Often the small sample interviews will have common themes which identify consistencies overall. Quantitative data collection should be larger than needed as there will be attrition in the number of final outcomes. In addition to surveys, results on retention, graduation, and grade point averages can be gathered through university systems.

A program with long term benefits should have a long term assessment tool. One such plan could be a longitudinal study including, where appropriate, beginning and ending attitude responses. These could be supplemented by qualitative and quantitative data collected throughout the study period. Also significant to the validity of the assessment would be the parallel study of another group which has not participated in the program. Evidence of the benefits of the program can be obtained through matching similar groups, such as the SEM students of the residence hall and the SEM students not living in the residence hall.

POSITIVE INDICATORS

The Committee was very naive in the beginning and neglected to build careful assessment into the programs. Hence current attempts to measure success are incomplete and subject to error yet there are several positive indicators that will be given below. The first graph is rather obvious and shows the growth in the MS&E Residence Hall over its first five years of existence. The second graph shows a grade comparison between MS&E Hall residents and non-residents in first semester calculus for Fall 94 and Fall 95. The third graph gives a comparison of retention data between all WSU students and WSU SEM students. Retention data is based on a student's first year at WSU and measures whether or not the student enrolls the subsequent year.





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