2009-10 Task Force on Student Educational Capacity
Faculty Make-up and Distribution and Class/Lab Availability Sub-Committee Report

Faculty Make-up and Distribution

The sub-committee based its conclusions and recommendations on faculty make-up and distribution upon data and analysis of departmental capacities provided by the academic chairs, the Office of Institutional Research, the Office of Graduate Studies and the Office of Sponsored Programs. Most chairs provided not only a thorough analysis, but also a genuinely passionate concern about the impact of increasing enrollment on the quality of the instruction they could offer, on research productivity and service commitments, and on their ever-more burdened staffs. There were a number of comments like these three: The increasing enrollment burden “is very demoralizing for faculty with serious research ambitions.” “Faculty are continuously being asked to do more and more with less and less.” “It is likely the learning experience already is more impersonal than it was a decade ago, and, as a result, probably student satisfaction has begun to slip.” As another chair concluded, “There is nothing more satisfying than helping people achieve their dreams. And as a corollary, there is nothing more dissatisfying than knowing you’re not doing it well.”

General Findings

- Determining whether a department is below, at, or above capacity cannot be based exclusively upon a simple count of how many seats in classrooms and labs are occupied. Capacity is the sum of many other crucial factors as well. In reporting on the capacities in their various courses and labs, department chairs explained that they had to employ a myriad of definitions to determine capacity: instructor’s teaching load, pedagogical style, need for class discussion, time needed for all students to make presentations, having qualified GTAs, having quality adjunct faculty, grading responsibilities, student interaction with instructors, number of majors, and availability of adequate lab equipment.
- Even after raising capacities from 50 to 100 students per section, Freshman Engineering had nine sections above capacity in fall 2009 and one section at capacity.
- All departments in the former College of Arts and Sciences face significant challenges meeting the recent enrollment surge in service courses, particularly in mathematics, chemistry, physics, and English.
- Most engineering degree programs, including those in the three largest departments, are above capacity in undergraduate majors.
- Most departments suffer from a lack of properly equipped labs.
- Among on-campus doctoral degree programs, two (representing 18% of on-campus doctoral students) are operating at capacity.
- Among on-campus masters programs, five (representing 43% of the fall 2009 on-campus masters students) are operating at capacity.
- Among off-campus masters programs, two from one department (representing 51% of the fall 2009 off-campus master’s students) are operating at capacity.
Almost all of the departments in the former College of Arts and Sciences report that they can accommodate more majors.

Nine departments report that they could accommodate at least a modest increase in graduate students.

While capacity remains for distance courses, a lack of adequate distance classrooms will limit expansion.

Conclusions

Virtually all departments report that they are at or, more often, above capacity in their service course offerings.

The largest departments on campus are above capacity in undergraduate majors (Mechanical and Aerospace Engineering; Civil, Architectural, and Environmental Engineering; and Electrical and Computer Engineering).*

Most departments report that their graduate programs are below capacity.

Warning Signs

The developments identified above have led to some signs that the surge in enrollment in recent years without an accompanying increase in tenure-track faculty hires has caused some deterioration both in the learning experience for students and in the ability of the faculty to produce the research expected of a research university.

An examination of the class GPA in service courses with major increased section capacity and those with overloaded section capacity (in the departments of Chemistry, Engineering Management, English, Geological Engineering, Geology, Math, and Physics.) reveals an overall decline between fall 2006 and fall 2009.

An examination of the Committee for Effective Teaching student evaluations of the above courses reveals that forty percent have experienced a drop in teacher evaluations.

The National Survey of Student Engagement, which Missouri S&T has utilized since 2001, suggests that our graduating seniors are noting a diminishing quality of instruction on our campus. Between 2001 and 2006, there was an improvement in student perceptions of “Level of Academic Challenge,” “Student-Faculty Interaction,” “Supportive Campus Environment,” “Active and Collaborative Learning,” and “Enriching Educational Experiences.” However, in each of those areas between 2006 and 2008, there was a decline in satisfaction. While it would be suspect to argue that this is a meaningful trend, the diminishing satisfaction occurred at a time when ever more of the campus’s classes were reaching or exceeding capacity and the results provide a warning of diminishing quality of the learning experience for our students.

While research expenditures are increasing, the number of faculty members with research expenditures has fallen each of the last two fiscal years and the number of proposals submitted is also decreasing. This is an important warning sign because S&T peer institutions like the Colorado School of Mines, RPI, Georgia Tech, MIT, and Caltec already
enjoy a clear advantage over S&T in graduate student to undergraduate student ratios. The enrollment surge has exacerbated the situation.

**Recommendation**

While the sub-committee understands that current anticipated growth will be in degree programs that are already at capacity, the circumstances identified above make it clear that the campus needs to pursue more strategic recruitment. Specifically, the sub-committee recommends a focus upon recruitment of graduate students into programs with capacity. This not only would enhance the research mission of the university, but also help maintain total enrollment while alleviating the challenges for overwhelmed undergraduate programs. This recommendation comes with a couple of caveats. Some undergraduate programs, notably several in the old Arts and Sciences College, could accommodate more undergraduates, but the subcommittee realizes that growth in those areas could aggravate the dilemma currently evident in service courses. The same situation exists with graduate programs as the faculty that teach and do research in these programs also have responsibilities in the undergraduate areas. Moreover, all graduate programs face considerable challenges in retaining the best of S&T undergraduates and in recruiting superior graduate students from other institutions or repute. (See the Appendix for a specific set of recommendations for graduate student recruiting.)

**Class/Lab Availability**

The sub-committee examined data on classroom utilization from the 2006-2009 fall semesters provided by the Registrar’s Office. This included the percentage use of all class times from 8:00 a.m. to 9:00 p.m. Monday through Friday for classrooms with 0-40 chairs, 41-60 chairs, 61-80 chairs, and over 80 chairs.

**General Findings**

- As the campus enrollment has grown, the percentage of available classrooms has dramatically diminished for most class times. Specifically, between 9:00 a.m. and noon and 1:00 p.m. to 5:00 p.m. on MWF and 9:00 to 5:00 on TTH are essentially at capacity. While the percentage of usage is much lower in the afternoons, there are a significant number of two and three hour lab sections that require afternoon times to avoid scheduling conflicts.
- Except for the three classrooms with 61-80 chairs, the 8:00 a.m. hour is underutilized each day. Similarly, the 5:00 to 9:00 p.m. hours are underutilized.

**Recommendation**

The sub-committee recommends that the campus seriously consider eliminating the 12:00-1:00 “free hour” on MWF in addition to offering more evening courses.

**Overall Recommendation**

The sub-committee sees this report as the beginning of a serious dialog for the entire campus, one engaging not just the academic departments in an effort to best shape our recruitment and retention efforts.
Appendix

Report Recommendations

1. Strategically manage student recruitment that takes into account the quality and department capacity constraints. Use performance based resource allocation to the extent possible for departmental recruitment efforts.

2. Doctoral and masters programs must be separated out for conducting more detailed capacity and quality graduate program analysis. Appropriate input and output metrics must be developed (that may vary by graduate programs) to measure quality and student success. The following indicators compiled from several sources may be used to engage faculty in discussions about quality and capacity of graduate programs at S&T:
   • Graduate Record Examination/TOEFL scores and percentiles, entering GPA
   • Graduate students applications/admits/enrollment from nationally/internationally recognized universities
   • Acceptance rate of students from S&T undergraduate programs and students applying from other universities
   • Job Placement
   • Time to degree completion
   • Ratio of Ph.D./MS students; Ratio of full-time to part-time graduate students
   • Student diversity
   • Research expenditures; Current research awards
   • Student-faculty ratio
   • Number of Post-docs and adjunct research faculty