

PSME Division

Program Review 2018-19 PSME Deans Summary

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4/14/19

The PSME Division has seen a significant decline in WSCH (-7%), during the past five report years, during which the College as a whole suffered a steeper decline (-12.3%). After 10 years of continuous and significant growth, enrollment began to decline starting in 2015-16, though at a rate far less than that for the College as a whole. During the same five year review period, overall PSME student success remained constant , rising just slightly (1%) during the final report year. The corresponding equity gap has remained remarkably constant at around 12%.

Enrollment, success, and equity trends varied strongly by department and circumstances during the past five report years.

In astronomy and meteorology, recent FT retirements have had significant temporary negative enrollment consequences, though with the recent hire of a new meteorology instructor and the addition of several new online sections these enrollments in F18 and W19 are now approaching earlier levels.

Chemistry enrollment over the past five years is up a small amount (1.3%) and is almost identical for the past two year, but is essentially limited by our laboratory staff support and lab facilities.

Physics WSCH for 2017-18 is almost identical to 2013-14, and engineering increased by 10.8% over the five years. Math, which dominates Division statistics due to its large size, has declined more significantly (-7.0%).

The last two years has seen more significant declines in enrollment, with math leading (and dominating) -5.8% from 2016-17 to 2017-18.

Within individual departments, large variations also occur from course to course. In math, we have seen significant enrollment increases in advanced courses with a concurrent decrease in basic skills level enrollment. Major recent changes in assessment policy (using HS gpa for placement) may be a causal factor, and the beginning of implementation of AB705 has caused further large perturbations in math enrollment trends through W19; however, the enrollment decline has seemed to have stabilized somewhat as indicated in recent S19 enrollments. Likewise, variations in success rates between courses are often startling. Math continues to have higher success rates and decreased equity gaps than in the past, but the progress is much

slower than anyone desires. The MPS program continues with significantly higher success rates and smaller equity gaps than math in general, though the nearly 70% expansion of the program in 2017-18 and the changes in AB 705 placement, especially at the pre-college levels, has reduced the success and equity differential in the lower level classes. At the same time, increased MPS support for Math 10 and the new pre-calculus MPS sequence have been especially effective in maintaining the strong positive success and equity differentials in those course levels.

In short, issues of enrollment, success, and equity are complex, driven by both internal and external factors, and difficult to predict or control. What I can offer is a summary of what I see as a commonality across departments and courses and some of the issues that I feel might be addressed in order to improve the performance of our Division:

- Loss of experienced, quality, full-time faculty
 - The loss of a single FT meteorology/astronomy instructor who taught very large concurrent classes, taught 5 sections per quarter, and taught four quarters per year had a very significant effect on enrollment. These negative effects are just beginning to be erased as the effects of our new full-time meteorology instructor take hold.
 - The loss of 5 FT math faculty to retirement with a single replacement position last year and the loss of an additional 4 FT math faculty anticipated for this year (with 0 replacements in sight) have and will have a devastating effect on enrollments and the recruiting of qualified and effective part-time replacements. Although math is a large department, this huge net loss also affects our ability to develop curriculum and equity-oriented initiatives and lowers department morale. This is especially important in a time when AB 705 implementation has a major impact on enrollment patterns and student preparedness.
 - The loss of a highly experienced FT Astronomy faculty member to retirement at the end of this year in a period of little to no hiring will further impact enrollment and the quality of teaching.
 - The difficulty of recruiting any quality PT faculty in the areas of astronomy, chemistry, meteorology, engineering, and physics due to competition with other employment opportunities and due to extreme regional housing costs and traffic.
 - The difficulty of recruiting, hiring, mentoring, and evaluating a continual stream of PT math, physics, chemistry, and engineering faculty. This burden is accelerated as there are fewer and fewer FT faculty left to assist in the process.
 - When funding and enrollment allow, I hope the College restores some of the key FT faculty positions that have not been replaced. However, given the current District financial status, it is not reasonable to expect replacement hiring in the near future.
- Additional staff resources

- The chemistry and physics departments have a real need for additional laboratory technicians. The current inability to support lab courses has a measurable effect on student enrollment and success.
 - Although we have been able to hire an evening stockroom clerk to support our evening chemistry program and have through a generous donation been able to hire a part-time afternoon laboratory technician, the temporary and part-time nature of the positions preclude finding a dedicated, high level technician capable of maintaining our current chemistry program and supporting the unmet student demand for our chemistry courses. I would recommend that we consider consolidating these positions into one full-time chemistry laboratory technician, better able to provide the needed support.
 - Both the chemistry and physics department have provided detailed and reasonable justifications in their individual reviews for hiring staff in these positions, and I support their arguments fully. Given the current District financial circumstances, I do not foresee hiring for these positions in the immediate future, but I do think it worthwhile pointing out their continuing need and rationale.
- Division level counselors
 - We can learn from our successes; the MPS model of embedded counselors and the increase in PSME counseling made available through a grant have had very significant positive effects on enrollment and success.
 - For financial reasons, it is unlikely that we will be hiring new counselors from our usual labor funding. However, to any degree possible, we should apply as many resources as possible to increasing direct counseling support to our most vulnerable students. This need will become even more important with the implementation of AB 705 and the accelerated expectations on our basic skills students. Basic skills, equity, and any AB 705 funding would be well utilized by supporting program level counseling.
 - AB 705 will necessitate a major change in curriculum and approach to the teaching of mathematics in the State. It will change how advising, counseling, and other student services support the affected students and curriculum. It will also affect prerequisites and assessment. Furthermore, as many students will be impacted by program changes in both language arts and mathematics, there will be a necessary interaction between those disciplines in scheduling. I anticipate a need for a formal structure that brings many areas of the College together to provide a smooth and effective implementation of this major initiative.
- Equipment Funding
 - I strongly support funding PSME Division equipment requests. They are minimal and necessary. Having hands on experience with equipment is critical to the mission of science and engineering education and a strong enhancement to the engagement of

students. We have pared our equipment and facilities requests to the bare minimum required to sustain a science program.

- Chemistry has a need to replace broken equipment. We are not allowed to impose a breakage fee on students. The equipment requested are used in a large number of chemistry classes, and lab experiments cannot be done without them.
 - Chemistry requires ongoing and supplementary lottery funds to purchase required chemicals and supplies. The chemistry program has grown substantially over the past 5 years, and the funds are critical to maintain our laboratory courses.
 - Funds for the repair of chemistry and physics equipment are not allowed from either equipment or lottery sources. Maintenance contracts are critical for our ability to keep expensive and key equipment functioning. Although in the past funds have been available to purchase new equipment, it is a waste of money and resources to replace expensive equipment when maintenance and repair can be done at a fraction of the cost. We need a \$5,000 supplement to the B Budget or another reliable source of funding that can be applied to these needs.
 - Physics needs a replacement of laboratory computers that were more than 12 years old and are no longer working. Lab experiments require these computers for data acquisition and analysis.
 - The engineering program has seen a large increase in enrollment over the past 10 years, and success and equity rates have shown equal improvement. We have slowly acquired a necessary set of student lab stations required for engineering projects, and we need to continue a slow increase in these resources so that students can gain individual experience with hands-on engineering projects. The engineering faculty have requested a small equipment allocation to purchase additional student laboratory work stations.
- Professional Development
 - The Division has a need for enhanced professional development opportunities in chemistry:
 - Chemistry safety training: I would recommend that staff development funds be allocated for practical, relevant training for our chemistry faculty and that training be offered on a continuing basis to all new faculty hires and as a periodic refresher for all chemistry faculty. The department has contacts with personnel who are certified in chemical hygiene training and who are well

qualified to provide such training. Faculty development funds should be provided to support this critical need.

- The college continues to place a strong emphasis on equity. The large equity gap in many PSME courses is common to similar programs throughout the US, and is in many ways inherent to our national and STEM culture. In the past we have emphasized recognizing and quantifying this equity disparity. However, if we truly wish to take a leadership role in enhancing equity in STEM programs, we need a significant commitment to equity training specific to these disciplines. We need to especially provide paid opportunities to our part-time faculty who teach the majority of our classes. The training must be significant in quantity and quality and needs to be specific to the needs of STEM faculty and students. The payment for participation by part-time faculty must likewise be significant if we expect poorly paid faculty to be able to give up other opportunities to engage in these critical efforts.