

Program Students

Additional Qualitative Data: (e.g. grants, partnerships, program activities)

New Chemistry Club

Analysis/Discussion:

The gender distribution of students in chemistry is 54% female and 46% male. Students enrolled in the chemistry program are mostly continuing students (71%), compared to 57% college-wide. This figure and other data from the math and English departments suggest that students who come to the college enroll in other disciplines such as Math and English, where the percentage of first time college students is higher, before enrolling in sciences courses. The percentage of continuing students for biology is 69%, and closer to the chemistry department's 71%. Indeed, the percentage of first-time college students (6%) and students new to MiraCosta (11%) is lower in chemistry compared to the college where they are 10% and 13% respectively. This is confirmed in the percentage of high school students enrolled at the college, who represent only 1% in chemistry for 3% in the college and 74% of our students are high school graduates while 70 % of the college as a whole are.

Of the students enrolled in chemistry, 83% are aged between 18 and 29 while only 70% of the college is in this age group. These percentages are in line with the fact that students enroll in chemistry mostly for transfer purposes and at a percentage much higher than the college (71% of chemistry students compared to 54% of college). An additional 5% of students in chemistry as well as the college, are 4-year college students taking courses to meet their college requirements. The department's high rate of transfer is in line with the college's Institutional Goal objective II.3 pertaining to increasing students' transfer readiness. The department's degree completion rate is low and will need to increase over the years with better advising and improved coordination with the chemistry liaison counselor. Stronger rapport between faculty and students will also occur through the newly created chemistry club, which could have a positive effect on the department's rate of degree completion.

Students' ethnicity percentages are virtually the same for White and Hispanic students in the department and college. As the college embarks into its efforts of increasing the proportion of Hispanic students and becoming a Hispanic-serving institution through a campaign targeted at Hispanic students, per its institutional Goal objective II.1, we expect the department to increase its Hispanic student population as well. Our department serves 13% Asian/pacific Islander students, while the college is at 8%, and our department only serves 2% African-American students, which is half of the college's 4%. This disparity and lower percentage is inherent to the college population, but it also requires that we keep up with our efforts to recruit all around the district and continue to be involved in the community with activities like the MCC science fair that will help attract students to the college and to our department.

A look at our grade distribution shows that students at entry level chemistry courses have lower passing percentages due mostly to a lack of preparation and weak math skills. This is why we have applied for and received a grant from BSI/Student success to help alleviate this problem and improve on the Institutional Goal objective II.1 related to student success. Indeed, passing rates for introductory courses range from 56% to 63%, with percentage withdrawals between 25% and 29%. However, the passing rates range from 77% to 88% for continuing courses. We have not found any significant difference in the pass percentage by gender, as male pass at 72% rate and female pass at 68%.

Program Curriculum

Additional Qualitative Data: (e.g. grants, partnerships, program activities)

Revised and updated Chemistry courses: 100, 102, 110, 111, 210, 211. These chemistry courses can now be offered as hybrid courses.

Analysis/Discussion:

Out of the 8 chemistry courses now taught in our department, 6 were revised and approved by Courses and Programs in Fall 2010. The remaining chemistry courses, CHEM 104 and 108, will be updated in the 2012 cycle, and will also include hybrid status. These revisions will have the advantage of giving flexibility to our students and will ease room scheduling on campus.

Being at the end of the SLO cycle this semester, we have assessed and entered into TracDat all courses for which SLOs were written before 2009, as well as 50% of the ones that had been written since then. The chemistry faculty review modes of instruction on an on-going basis, as part of their professional development. They participate in workshops and conferences to get acquainted with new methods of instructions and incorporate them in their teaching. Some faculty members have implemented POGIL (Process Oriented Guided Inquiry Learning), and others have introduced student clickers into the curriculum to actively engage, retain and increase student learning. A grant from the MCC foundation has help increase the number of faculty members using clickers daily from 2 to 6.

One faculty member took a sabbatical last semester and rewrote the entire CHEM 100 lab manual, which is used in 9-10 sections yearly, therefore bringing up-to-date these lab experiments and improving learning for approximately 300 students a year. Individual instructors are working on specific lab experiments with emphasis on instrumentation to keep our students up-to-date in chemical laboratory techniques. Modern instrumentation in the laboratory actualizes MiraCosta College as a vanguard educational institution, while providing current knowledge for our graduates in the market place.

The chemistry program has incorporated student learning outside the classroom by involving them in the MiraCosta's "Kids at College" program. In this program, our students perform hands-on experiments with local Elementary School students. Chemistry students also perform hands-on experiments with community members in outreach events such as : MiraCosta's Math and Science Fair, San Diego's Annual Science Expo at PetCo Park, and the Encuentros' Event at MiraCosta for Middle and High School Latino students. These events, with a significant contribution from our students, have increased visibility to the chemistry department and to the college satisfying its institutional objectives of becoming a Hispanic-serving institution as well as being a conscientious community partner. Some instructors have made Service Learning an integral part of their courses as well.

Program Personnel

Additional Qualitative Data: (e.g. grants, partnerships, program activities)

In the last year we have asked and obtained the funding for:

* one Instruction assistant to be converted from 30hr/week to 40hr/week in a 10 months contract.

*extension of the contract of another Instructional associate from full time 10 months to 12 months to cover our ever increasing summer program.

Analysis/Discussion:

The faculty members in the program stay current in their discipline by actively participating in flex workshops offered during college flex weeks. They all hold memberships in a number of professional organizations, such as the American Chemical Society (including both the Division of Chemical Education and the 2-Year College Chemistry Consortium), the National Science Teachers Association, the Society of College Science Teachers, and the American Association for the Advancement of Sciences. All faculty members keep current in the discipline and teaching methodologies by reading discipline specific literature and integrating the latest chemistry information in their teaching curriculum. The faculty members regularly attend conferences and workshops organized by the ACS regional and national organizations and other institutions as well as workshops organized by our chemicals and equipment suppliers. The department is organizing a Conference for the Two Year college chemistry consortium (2YC3) for spring 2012, which will promote the college's Institutional Goal V of being a conscientious community partner through local industry and academic professions coming to our campus.

Our Instructional associate staff has started an annual program of participation in OSHA training classes. We expect to continue professional growth opportunities for our Instructional Associates, and will require additional financial support from the college to that end.

The program has requested and obtained, in the last Program Review, an increase in the number of hours for our then part time instructional associate. This has stabilized our coverage of lab and made it relying less on student workers. The high level of growth we have seen this past year and the acquisition (partial) of the science lab in the horticulture building however suggests that we might need more Instructional Associate help in the near future.

The program currently has 5 full-time, tenure track faculty (4 tenured and 1 non-tenured). The total FTEF for Chemistry and Physical Science in Fall 2011 is 12.2 and the FT faculty/FTEF percentage is 40.9 %. When reassigned time is included, this ratio falls to 34.4%. (NOTE: The Physical Science program and courses have been taught and administered by chemistry faculty since its inception).

Chemistry courses are required for virtually all science and engineering transfer programs, nursing and other allied health transfer programs, and for some CTE certificates as well. As the number of students in these programs has increased, the number of chemistry sections has grown at a phenomenal rate: a 30% increase in chemistry FTEF in just three years, from Fall 2009, when the chemistry program last hired a full time faculty. Over the past few years, the statewide demand for nurses has increased dramatically, and MiraCosta has added new programs in this area in response to the demand, and made connections to new and existing programs at CSUSM, all of which have placed greater demands on chemistry courses at MCC. For instance, the one-semester general-organic-biological chemistry course, Chem. 104, was first taught in fall 2007 with less than a dozen students, but we now offer 6 sections (2 sections in Fall, 3 in Spring and 1 in Summer) per year, with an ever increasing number of students on waitlists.

As MiraCosta College has grown, the chemistry program has been an important part of that growth, but the program will be able to keep pace only with the addition of a new full time chemistry instructor.

Program Resources

Additional Qualitative Data: (e.g. grants, partnerships, program activities)

We have recently acquired a 5 year-old auto sampler Gas Chromatograph (\$25,000 value) and a micro sensitive balance (\$ 7,500 value) through a donation from the DEA (Drug Enforcement Administration).

Analysis/Discussion:

As we have indicated in our last program review, many community colleges in southern California own and incorporate advanced instrumentation into their chemistry program. We have cited such instruments as nuclear magnetic resonance (NMR) spectrometer, mass spectrometer, UV-Vis spectrophotometers, and high performance liquid chromatograph (HPLC). With a goal of becoming a vanguard institution (Institutional Goal I), our program and students should benefit greatly from the acquisition of these instruments in the future, and their incorporation into our curriculum will significantly improve our graduates' marketability. We now have 2 full size gas chromatographs that have been scheduled and approved for replacement since Fall 2006 but have not yet been replaced. We have now found that we can acquire a newer and smaller size gas chromatograph (GC) at 1/10 the price of a full size one. We can purchase enough of the smaller GC 's to have enough for each of our classes that use them for the same cost as replacing the two GCs we currently have. These mini-GCs are portable and therefore they can be used everywhere within our facilities with ease.

Current stockroom space is no longer adequate. Indeed our recent growth has been putting a lot of strain on our general storage and laboratory preparation areas, and if the current rate of growth continues, our program will exceed space capacity very soon. Currently, the storage room at the 4500 building on the OC campus is increasingly cluttered with lab carts that obstruct movement within the workspace.

Although great effort has been put into improving this situation, it still creates a safety hazard. It is increasingly difficult to properly manage all lab sections in the work space assigned to the program. Some relief has come when we were given access and rentership to OC 7003 lab room in the HORT building, and we have been able to schedule 2 lab classes in it for Fall 2011 and Spring 2012. It is still true that our main laboratory facilities in the 4500 building were designed to accommodate 24 students, but our lab courses have 30 students giving each lab 6 extra students, which represents 25% more student population in the laboratory room than originally conceived. It is difficult for instructors to roam around the room for proper supervision while students are working, which is clearly a safety issue. Moreover, the disciplinary norms for Chemistry Programs in Two-Year Colleges (as established by the American Chemical Society), recommend a ratio of 25 students per instructor in the laboratory. Laboratory facilities are also inadequate at SEC. For this reason, the planned expansion of offerings at SEC to include all prep-for-major courses will not be effective until we have a new and dedicated chemistry space there. Because the SEC facility relies on the use of the Biology laboratory room, which is also boasting high demand and fill rates, it is highly improbable that we will gain more space to offer more courses than the current ones. A complete series of our courses is highly desired by the program and Dean of SEC, and it should increase both the general and Hispanic students enrollment in the southern region of the district as it is an institutional Goal. We have a need at the OC campus for a room dedicated to our chemistry resources center. This space would contain office furniture, white boards, computer workstations, and an area for tutoring. We envision this space as a support space for our chemistry students, which should further increase our student achievement and completion rates. This physical space will tie up with our virtual chemistry resources center online and satisfy Institutional Goals I and II.

Program Performance

Additional Qualitative Data: (e.g. grants, partnerships, program activities)

The Chemistry Program has obtained 3 grants. From the MCC Foundation: \$2,500 for the implementation of the Chemistry Resources Center (2009) and \$2,485 for the purchase of 2 clicker sets used in our classrooms to assess students comprehension in real time (2010). From BSI/Students Success Committee: \$9,600 to implement Math review workshops and expand the Chemistry Drop-in Tutoring Program at OC while starting the program at SEC. The Chemistry Drop-in Tutoring Program has served 244 students in the first offering (Sp10), and approximately 750 students in Academic Year 2010-2011.

Analysis/Discussion:

Total enrollment in chemistry has been continually increasing for several years, with an increase last year of 9.2%. This is significantly greater than for biology, which is a comparable program, and which increased by 1.7%. The college increased 3.6% as a whole. During the same period, the student head count has increased in chemistry by 13% compared to the college 3.3%. Chemistry increase in WSCH of 10% is comparable the college's 9%, but three times higher than biology at 3%. Our WSCH is in line to reach the CMP target for 2015 within a year or two. Based on these data, the chemistry program is much more productive than the college as a whole. Our productivity ratio (WSCH/FTEF) is 8% higher than the college and is already 4% higher than the CMP target for 2015. Although chemistry courses have a limit of 30 students per lab section, our annual WSCH/FTEF stands at 452, about 16% away from the statewide target of 525.

The Chemistry program's fill rate of 99% shows that the program is cautious with its resources, and makes careful scheduling decisions, while serving student needs. This fill rate satisfies Institutional Goal III on effective planning processes and Institutional Goal IV on fiscal prudence. Our student fill rate is 4% higher than the CMP target of 95% for 2015 and the college rate of 94% for fall 2010. Our program's average enrollment per section of 30.96 is 8.3% higher than the college's 28.59 and is increasing. The program's FTES has increased by 9.7% in the last year, more than two fold compared to biology, as the college went up by 7%. The vibrancy of the chemistry program is illustrated by the fact that, like biology, we have kept the number of our course offerings constant since 2007 while the college has seen a slight decrease. The number of course sections has increased by the same percentage as the college. With partial 2011 results, the chemistry success rate is virtually the same as the college and stands at 3% higher than the state. This result contributes to Institutional Goals I and II pertaining to the college as a vanguard institution and a place where students have a high likelihood of success. So does our average retention (partial results) rate of 79%, slightly higher than biology, but close to the state's 80% and the college's 82%.

We have continuously evaluated our program's teaching efficacy through SLOs and have found, in most cases, that students met the required outcomes in our courses. For the case in CHEM 104 where we did not have a satisfactory number of students able to meet the learning outcomes, our investigation showed that the assessment needed some clarifications in concepts where students were being assessed. Now that the clarifications have been put in place, students will be reassessed on this SLO in fall 2011.

In order to further increase student success per Institutional Goal II, our department has instituted and is administering a diagnostic test: The California Chemistry Diagnostic Test. This test is distributed by the American Chemical Society, and helps evaluate the level of preparedness of students. We have administered it to some CHEM 100 students, as well as those who claim to have sufficient chemistry knowledge to successfully enroll into CHEM 110.

Degree and certificate paths, pre- and co-requisites and course sequencing in our program are consistent with those at neighboring community colleges and universities.

Attachment 2 Instructional Standards

Review Area	Standards
<p>Program Performance</p>	<p>Have program enrollments across the range of curricular offerings been in line with expectations, relative to college-wide trends and/or to enrollment trends in comparable programs at other educational institutions?</p> <p>Are the student/faculty ratios and class capacities in this program consistent with college expectations, disciplinary norms, and with sound educational practice?</p> <p>How effective is the program in attending to and promoting the success of its students in terms of course completion rates, course grade distributions, degrees and certificates awarded, transfers to other institutions, assessment of course-based student learning outcomes, objective evaluation of student preparedness (assessment, placement, course pre- and co-requisites), market and industry trends, advisory board feedback, and other comparable issues?</p> <p>Were Student Learning Outcome Assessment Cycles (SLO ACs) conducted as specified in the timeline? How have the results of completed SLO ACs been used to provide continuous improvement to the operation of the program?</p>
<p>Program Resources</p>	<p>Are the offices, work areas, intranet and enterprise technology resources, storage, and other spaces assigned to the program sufficient in terms of square footage, location, quality, and upkeep to optimize departmental performance? Of what quality are the facilities that currently house this program and in what ways do these affect the ability of the program to achieve its objectives?</p> <p>Is the program provided with supplies, software, and equipment appropriate in kind, amount, accessibility, and quality to address the needs of staff and students in the program and to meet program requirements and objectives?</p>
<p>Program Personnel</p>	<p>Is the program provided with sufficient resources and opportunity to allow its staff to remain abreast of current trends and requirements, to develop job proficiency and expertise, to serve onsite and online students, to learn new skills and to explore new initiatives, or to make innovative contributions to the functioning of the department?</p> <p>Is the program provided with sufficient administrative and staff support to meet its objectives and to perform to the standards that it and the college expects?</p> <p>What actions have the faculty members appointed to the program taken to remain current in the discipline? What change to the program faculty in terms of new appointments, promotions, retirements, or resignations have occurred since the last review of the program?</p> <p>Is the distribution of tenured and untenured, permanent and temporary, full-time, part-time, and overload assignments appropriate and in keeping with college or disciplinary standards?</p>
<p>Program Curriculum</p>	<p>Has the curriculum in this program been kept current and contemporary through regular reviews of and modifications to approved courses, contents of course outlines, modes of instructional delivery, degree and certificate paths, pre- and co-requisites, course sequencing, student learning outcomes, articulation agreements, and other comparable issues?</p> <p>Have student learning outcomes (SLOs) been written for this program? Are the discipline and program SLOs still relevant?</p>
<p>Program Students</p>	<p>Consider the profiles of students in your program and address whether this is changing over time, if there is an underlying cause driving the change, if you expect the trend to continue, and how the profiles compare to your peer-group and the entire college.</p>