

Innovation of the Year Nomination: Chemistry Scholars Program

A. Chemistry Scholars Program, Glendale Community College, Dr. Robert Blake and Dr. Jason Serin, Residential Faculty at GCC. (Robert Blake: 623-845-3647)

B. Executive Summary: Chemistry Scholars are exceptional students who tutor other students. Peer tutoring promotes long-term retention of information and mastery of fundamental ideas for the tutors, provides extra learning support for struggling students, builds community between students and faculty, and provides students with teaching experience.

C. Description: The Chemistry Scholars program is an innovative program because it engages exceptional students in a teaching role that is traditionally reserved for faculty members. The primary result of this program is a dramatic expansion of services to help struggling students. "Chemistry Solutions" is the department of Chemistry tutoring program. Before the Chemistry Scholars Program, this was called "C.H.E.M. (Chemistry Help Every Monday)" and was limited to one day per week of assistance for students. Even after increasing the faculty commitment to this program, tutoring was only available on Mondays and Tuesdays. Since the Chemistry Scholars provide a competent, affordable work force, the department is able to provide tutoring to students five days a week, with multiple tutors available during most time periods between 9:00 AM and 5:00 PM. The peer tutors have received great praise for their work. Students who have attended Chemistry Solutions describe the Chemistry Scholars as friendly, helpful and approachable. Records indicate that typically between 5-10 students per hour attend Chemistry Solutions, so the creation of the Chemistry Scholars Program has provided an estimated 5000 student hours of assistance for students in Chemistry courses. Fall 2012 provided an average of about 50 hours per week and Spring 2013 also currently provides about 50 hours of student tutoring per week. Over the course of the academic year (not including additional summer hours), an approximate 750 hours of tutoring will be provided by Chemistry Scholars.

An exceptional secondary benefit of this program is the degree to which participation has benefitted the Chemistry Scholars. The tutoring experience creates an environment of continual review and reinforcement of fundamental ideas in chemistry for the Chemistry Scholars. This strengthening of pre-requisite knowledge is advantageous for students who take the demanding Organic Chemistry courses at GCC, as shown by the academic performance of the Chemistry Scholars in these courses. Reviewing the pre-requisite knowledge often necessitates meeting with instructors to get advice or clarification on best practices for tutoring specific topics. This increased communication with faculty helps the Chemistry Scholars continue to be successful in chemistry courses. Several of the Chemistry Scholars have also gone on to participate in Dr. Serin's research project using the Nuclear Magnetic Resonance Spectrometer that was recently acquired using National Science Foundation funding. The degree to which the Chemistry Scholars are part of the Department of Chemistry community is unprecedented, due to the increased student-faculty contact that they enjoy. A few of the Chemistry Scholars have also taken positions as part-time assistants in the Chemistry Stockroom. One of the national issues in Science, Technology, Engineering, and Mathematics education is a severe shortage of qualified teachers. It is hoped that exposing some of our best students to teaching might cause them to seriously consider a career in teaching in the future.

Program Criteria: The program criteria that are specifically addressed by the Chemistry Scholars program

are:

- 1) **Improved critical thinking skills** for the Chemistry Scholars: In order to teach a concept to other students, the Scholars have to truly understand it and make connections on a deeper level in order to be able to explain it in different ways for different students.
- 2) **Increased retention of concepts and improved performance in subsequent classes:** Although the numbers of students participating in Chemistry Scholars has been increasing, the sample size is too small at this point to collect quantitative data. However, qualitative data from instructors of the Chemistry Scholars indicates that they are very successful in their chemistry courses.
- 3) **Increased retention in courses:** This applies to both the Chemistry Scholars as well as the students who receive the tutoring. Struggling students find it easier to relate to material explained by their peers and often feel more comfortable asking questions of peers rather than instructors. Chemistry Scholars' retention in courses increases because of increased confidence in material and frequent communication with instructors to ensure appropriate explanations to tutored students.

Innovation Criteria: The following statements identify how the Chemistry Scholars program meets the criteria for Innovation of the Year:

Criteria No. 1: *Quality* - It is evident that the innovation increases "quality" in the course, program, office, or institution.

Maricopa Value: *Education*

- **One-on-one tutoring is the highest quality form of education.**

Criteria No. 2: *Efficiency* - There is evidence that the innovation contributes to a more efficient way of doing things.

Maricopa Value: *Responsibility*

- **The set-up of the Chemistry Solutions program gathers many students to one central location, so that Chemistry Scholars can help many students in one session.**

Criteria No. 3: *Cost Effectiveness* - There is evidence that the innovation adds a value to the institution while at the same time containing or reducing costs.

Maricopa Value: *Responsibility*

- **Student assistance provides high quality assistance to their peers at a very affordable price.**

Criteria No. 4: *Replication* - The innovation selected can be replicated in other institutions with a minimum of difficulty.

Maricopa Value: *Excellence*

- **Many departments and colleges throughout the Maricopa system have excellent, successful, helpful students who can serve as tutors. This program can easily be replicated district-wide.**

Criteria: No. 5 Creativity - The innovation should be as original as possible or the adaptation should be creative.

Maricopa Value: *Excellence*

- **Many instructors often include peer teaching as an effective learning tool in the classroom. Expanding that methodology to a more formal tutoring program is a creative use of a popular and successful teaching method.**

Criteria No. 6: Timeliness - The innovation should not be more than five years old in the institution, but it must have been around long enough to be tested so that it meets most of the criteria.

Maricopa Value: *Excellence*

- **Chemistry Scholars program was first presented in spring 2010 and implemented in Fall 2010. The program has been steadily growing since its inception with more students requesting participation in the program and more students utilizing the peer tutoring as a source of help. In Spring 2013, we currently have 7 paid tutors plus three volunteers.**

Criteria No. 7: Learning - The results of the innovation have been shared with others for the benefit of students throughout Maricopa.

Maricopa Value: *Education*

- **This innovation has been shared at the Chairs meeting. One of the reasons we are submitting this nomination is to increase visibility of the program.**

Criteria No. 8: Collaboration - The innovation successfully demonstrates collaboration, teamwork, and cooperation to ensure continuous process improvement efforts on behalf of students throughout Maricopa.

Maricopa Value: *Excellence*

- **Through this program, we have faculty, veteran Chemistry Scholars, novice Chemistry Scholars and students working together to improve teaching and learning. Scheduling and promotion of the program also involves department staff members.**