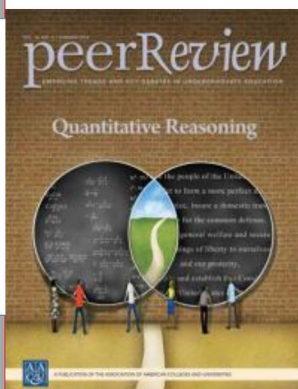




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Peer Review

The Quantitative Skills Center at Pomona College: Year One Review

By: Travis Brown

Pomona College is a liberal arts college located in Claremont, California. It is a founding member of the Claremont Colleges (along with Claremont McKenna College, Harvey Mudd College, Pitzer College, and Scripps College), and approximately 1,500 undergraduates are proud to call themselves Pomona "Sagehens."

Pomona has a diverse student population, but as is the case at many colleges and universities across the country, students from underrepresented backgrounds—African American and Hispanic students in particular—do not pursue degrees in the natural sciences (particularly math, physics, and chemistry) and mathematics in the same proportion as white and Asian students. Our approach to liberal arts education fosters exploration and discovery, and our hope is that all students find their true passion. However many students who experience struggles in quantitatively heavy gateway courses may reconsider their initial love of chemistry, physics, economics, or mathematics and pursue an alternate path. Retaining students in science and mathematics requires a comprehensive approach to teaching, advising, mentoring, and supplemental instruction.

Creating Our Quantitative Skills Center

The Quantitative Skills Center (QSC) was created to support the needs of future and present science and mathematics majors, improve the quantitative reasoning skills of all Pomona students, and promote quantitative literacy as a goal for all Pomona graduates. The center was born out of an effort to address those quantitative skills most crucial to success in "gateway" courses, and as happens at small liberal arts colleges, it was not a quick birth. Faculty discussions about the center can be traced back to the early 2000s, but a 2009 white paper written by a team of faculty and deans established a more concrete plan. The broad strokes of the paper described a learning center with a full-time director, dedicated space, a focus on peer tutoring, and support for faculty-led department-level supplemental instruction programs. Other activities included in the initial scope of the center included software support (SPSS, Excel, LaTeX, etc) for students, training for departmental mentors (a group of department-based peer tutors that hold group drop-in homework help sessions), and support for upper-division courses.

The initial funding for the center was generously provided by the Arthur Vining Davis Foundation, which awarded \$250,000 in 2012 to provide enough funding to cover two years of operating expenses for the center. I was hired in January 2013, and the center's invaluable administrative assistant, faculty steering

committee, numerous student mentors/fellows, and I have created an academic support program and center that, for the most part, meets the objectives of the 2009 white paper. Has everything worked according to plan? Of course not (I will mention some of those lessons learned below), but overall our first year was successful.

While much of what Pomona College needed to institute a new academic learning center was in place, the details of how that would actually be implemented were up to me. I would not say that I had a blank slate, but I was certainly given the freedom to respond to student concerns. Much of my first semester was spent just trying to meet students and get to know the campus. I introduced myself in classrooms, at cohort program meetings, and at club meetings. My goal was to quickly build relationships, first with students and second with faculty and administrators, so that I could hear open and honest feedback about why students—particularly students of color—were arriving on campus with the goal of becoming a scientist but not persisting to graduation with that dream intact. We didn't build something and just expect students to participate. I attribute a large part of our initial success to taking the time to generate student buy-in before setting up a new support center.

QSC Implementation

The presence of our writing center and college writing program was, and continues to be, a large influence on how we have structured the QSC. The writing center has a long history of working with students on their written communication skills, and the deep institutional memory has helped create a campus culture in which getting help with writing is, according to students, “just what you do.” My goal was to create the same type of campus culture for help with math or science, but the nature of the disciplines has made this more difficult than expected. Having your writing reviewed is a requisite of the writing process itself. Having someone help you with calculus or organic chemistry is not typical for these fields. Students typically only seek help when they fail to meet an objective (usually the correct answer on a quiz or exam), and taking the necessary actions to fix it (seeking help) can be very challenging. Getting students to use the QSC's resources before they are too far behind in their coursework has been a challenge, but we've made some strides in that direction.

After a semester of fact finding, the summer of 2013 was spent developing the tutoring program and working with our information technology services team to create a simple online system for students to sign up to meet with a tutor. I cannot stress enough how important it is to establish a low barrier of entry for academic support services. Our goal was to create a system in which a student did not have to contact a faculty member or administrator in order to receive tutoring, and our online scheduler only requires a commitment from the student that they will meet their tutor at the appointed time and location. Approximately 99 percent of the study sessions that have been reserved in the past year were fulfilled, and students report great satisfaction with the online reservation system.

In the fall of 2013, we began offering individual and small-group study sessions. At this time we did not have a dedicated space, so we operated as a virtual center and used various classrooms and computer labs across campus as meeting rooms. Our initial pool of tutors, or “fellows,” was inherited from a previous tutoring program that the dean of students' office ran for many

years. We added to this small group of fellows as the semester wore on, and ended up with thirty-two QSC fellows by the winter break.

QSC Fellows

Our fellows are the cornerstone of the QSC, and I can't say enough about the hard work and dedication they have shown this past year. Fellows are all top-performing students who have shown an interest in tutoring and have been recommended by faculty. I try to be as accommodating and flexible with their time as possible, and typically a fellow will work between two and six hours a week, with their study session times mostly set by them (our hours are 6pm–11pm, Saturday–Thursday). Fellows are paid and I guarantee the number of hours they work. But no fellow books 100 percent of their hours (although several were above 75 percent), so there are times when I am basically paying fellows to get their own work done (which is the case with many campus jobs). This system has worked well for our fellows, who are busy students themselves, and it also allows a small school like Pomona to leverage our talented students in multiple ways. For instance, many of my fellows also are employed by departments as mentors, and for certain upper-division courses there may really only be one or two students on campus qualified to tutor.

In our first year we provided course-based tutoring (although our fellows were not required to sit in on any classes or meet with the professor—this will be changing for next year) for courses in mathematics, physics, computer science, biology, chemistry, economics, and statistics. We expected to cover introductory courses but it came as a surprise to us how many students needed help with upper-division math, physics, and computer science courses. As needed, we hired fellows and added study sessions to the calendar. Overall we booked about 30 percent of the total number of offered study session hours, with our most popular subjects being biology (50 percent of offered sessions booked) and statistics (60 percent of sessions booked).

Statistics can be a challenging topic to tutor because it comes up in many different ways in many different courses. But we decided to hire a graduate student to be our “stats specialist,” and she became one of our most utilized fellows in the fall (also this past spring). The initial fear was that students seeking help with their senior theses would be coming to the QSC instead of their faculty mentor, and while we did end up working with a few seniors, the vast majority of our stats specialist's time was spent helping students with in-class assignments, group projects, and lab reports.

A Space of Our Own

Spring 2014 saw us move into a new dedicated space, centrally located on the second floor of our Smith Campus Center (upstairs from the writing center). Having a dedicated space for all of the study sessions has finally made the center “real,” and some students have started making it their own private study space. During the day, before study sessions begin, the center is available for any student who needs a quiet place to study. The QSC features three study rooms, a central lounge area, my office, and space for our administrative assistant.

Logistically, our spring semester went much more smoothly than the fall, and we saw our numbers increase slightly. We booked

about 350 total study session hours from about 130 students (up from about 120 in the fall). I can only estimate how many students utilized the QSC because in addition to our individual sessions (all reserved online and recorded), we also offered drop-in sessions that were not tracked online. Unfortunately, our fellows didn't always take attendance, which will change in the coming year.

Other challenges had to do with connecting with students about workshops and other events. Direct emails to students are not always effective, and posting flyers around campus wasn't drawing students to the center either. Often group student meetings can attract students by offering food, but every student at Pomona has a meal plan, so that strategy didn't work for us. Eventually we settled on day-of-the-event e-mails and Facebook posts combined with word of mouth (text your friends!) as useful ways of bringing students in for one-off workshops (e.g., Study Skills for the Sciences, Basics of Excel). But we found that the most successful approach to reach students was to work directly with faculty teaching courses we covered, and to directly work with the new retention programs we have developed in the last year. My work with several of our new initiatives to retain underrepresented students in the sciences has been an exciting development for the center.

Cohort Programs

All of us who work with underrepresented students (particularly in the sciences, but not limited to them, of course) have heard a similar story. A student arrives to campus; let's say our student is an African American woman. She was valedictorian, number one in her high school. Her plan is to become a doctor and major in biology. Maybe she is the first in her family to go to college, but maybe she isn't. In any case, she starts out her first college semester taking biology, chemistry, calculus, a writing course, and why not, a language class, too. Things are going along fine (she thinks) until about five weeks into the semester when the first round of exams hit. Low grades in biology and chemistry appear, and our student doesn't know how to deal with them. She's never gotten below a B on anything, and now she just pulled two failing grades. She starts to experience feelings of stereotype threat; maybe some pangs of imposter syndrome cause her to question whether or not she should be trying to pursue a science degree at all.

Because we know where this is headed, many of our schools have instituted programs designed to create a different story for our student by giving her the mentoring, advising, and academic support she will need to persist and succeed. At Pomona College we have two new cohort-based science retention programs, the Howard Hughes Medical Institute-funded High Achievement Program (HAP) and the home-grown Pomona Science Scholars (PSS). Students in both programs are from backgrounds traditionally underrepresented in the sciences and have shown a high degree of potential as science majors.

The twenty students in the programs just completed their first year in the college and have used QSC services at a higher rate than other first-year students. In the center's first year, I did not hire dedicated fellows just for cohort students (the goal was to simply encourage the HAP and PSS students to use the QSC services), but for the coming year I will hire QSC fellows to hold hours specifically for students in PSS, HAP, and our new Pomona Scholars of Math.

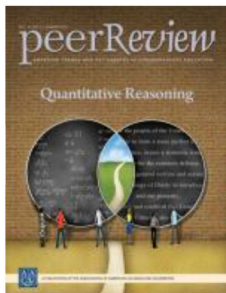
Conclusion

With two semesters under our belt, I can't say that we have solved all of the quantitative issues for students at Pomona, but we are off to an excellent start. We still have much to do—assessment, program development, and connection with more departments that use quantitative reasoning (psychology, for example) are three major endeavors for next year. We also will begin to focus on study skills and time management (for all students) as well as continuing our work with underrepresented students in the sciences. I have begun working with an increasing number of students who are dealing with feelings of stereotype threat or imposter syndrome combined with feelings of inadequacy because they have, many for the first time, experienced failure. How the QSC will play a role in working with students struggling in this particular way is yet to be fully fleshed out. Finally, we have plans to begin a campus conversation about quantitative skills versus quantitative reasoning. As many schools begin to shift from QS to QR, we will have to determine what that means for our campus and how the QSC fits into the conversation. Being very good at hammering a nail (QS) is not the same as building a house (QR).

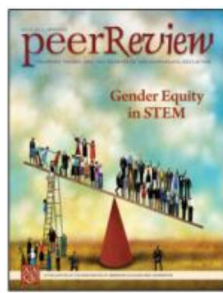
I hope this look back at the development of a new learning center over one year has been interesting and informative. If your campus is beginning to formulate its own quantitative support center, feel free to contact me.

Travis Brown is the director of the Quantitative Skills Center at Pomona College.

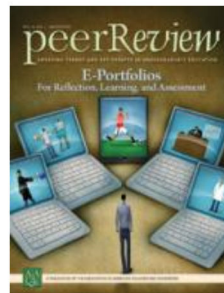
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