

TALC: Individualized Assistance Through Collaborative Learning

John A. Johnson

University of California-Berkeley Astronomy

Astronomy 10: Introduction to Astronomy has a long history on the UC Berkeley campus as a popular physical science elective. The fall Astro 10 class is particularly popular due to Professor Alex Filippenko's upbeat lectures drawing an enrollment of over 800 students this past semester. While Professor Filippenko's lectures are entertaining and presented in a very clear and organized manner, many students still struggle because of the inherent difficulty of the course material. It is often said that a student taking an introductory astronomy course is exposed to more new vocabulary and terminology than in an introductory foreign language class. Additionally, many of the students taking the course aren't comfortable with the mathematics and problem solving skills necessary to complete the homework assignments. As the Head GSI for Astronomy 10 last fall, I was challenged with administering effective, individualized assistance to the students who needed it most. The solution I developed is The Astronomy Learning Center (TALC).

TALC uses collaborative learning as an alternative to traditional office hours. Traditional office hours usually involve two or three students asking their GSI questions about homework problems and the GSI telling or showing the student how to do the problem. TALC uses the philosophy that students learn better by doing than just by hearing or seeing. In order to receive help with a homework problem the student must go to a chalkboard and start the problem from the beginning. The GSIs on duty then encourage other students working on the same problem to join the first student at the board and work together from start to finish. Groups are also encouraged to use props to visualize tough concepts and even act out ideas like planetary motion using group members as planets or stars. Once the group is finished with the problem on the board, the GSI erases their work and the students do the problem again on paper.

Having the students work in groups at a board has several advantages over a traditional office hour setting. First, if the students are in a group they tend to help one another and think out loud. This allows the GSI to stand back and monitor the work going on at the boards and offer assistance when needed. With all of the students' work out in the open on a large chalk board, one GSI can monitor the work of several groups of five to six students, thus allowing TALC to accommodate many more students than a regular office hour. Another advantage of having the students at the board is that common misconceptions and errors are out in the open and can be immediately addressed. Rather than pointing out errors directly, TALC GSIs use the Socratic method to carefully draw the group's attention to the mistake and point them in the correct direction. Use of this method not only fosters a positive learning environment but also forces the students in a group to take ownership of their work rather than depending on a GSI to give them the answer. Finally, students who come to TALC later in the session seeking help on a problem can be referred to students who have already finished that particular problem. The student helping his or her peer then gains a better understanding of the material and also receives additional practice. In this manner students receive attention not only from a GSI, but also from their fellow classmates.

Students have indicated that TALC is effective through their responses on class evaluations, comments to the course instructors and their consistent attendance throughout the semester. During the fall of 2001, TALC was open Tuesday through Thursday from 7-9pm with an average attendance of about 20 students per night. TALC students also scored well on the exams and not one student who attended regularly failed to pass the course. In future semesters I plan to make a more systematic study of student test scores to track improvements resulting from TALC, but for now the words of appreciation from my students are proof enough of TALC's success.