

Offering Academic Assistance to Students in Your Biology Lab

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Abstract

Despite the more active learning involved in laboratory versus lecture setups, some students still need extra-curricular assistance to succeed in biology. Using the experience and research of members of professional academic assistance societies, we setup "UC Action" at our university to 1) offer assistance to students in biology (and other) courses, and to 2) increase the retention and graduation rates at our university. Data from our Introductory Zoology laboratory assistance indicate that number and duration of student visits correlated positively with course grade. Workshop participants brainstormed ideas for offering assistance to their biology students.

Introduction

As assistant director of the Assessment and Learning Center on the University of Oklahoma campus, my job is to provide study skills seminars, provide environments to facilitate learning and studying, and facilitate learning assistance (tutoring) for our undergraduates. As an instructor of biology, I want my students to learn about the nature of science, master specific content, and develop biological literacy. The intersection of these two roles prompted me to encourage other biologists to be involved in their own academic support program for laboratory and/or lecture courses.

Even though we'd like to believe that our students come to us with the skills to learn, either from high school or from other college classes, experience and research shows us that this isn't true, even for students that did well in biology in high school (Jensen and Moore, 2008). Many students have been able to use common sense or memorization skills to achieve academic success. Since our job is to assist them in understanding biology and succeeding academically, something needs to be done beyond the current setup of courses and offering office hours. Certainly one area to explore is increasing pedagogically sound teaching methods that increase the critical thinking skills of students (e.g. Quitadamo, et al., 2008). While this reform and research continues, a new environment of external learning assistance could be a supplementary solution. I propose that a more structured, low-pressure, student-centered, deliberate environment using trained peers will benefit our students.

Your campus may already employ staff in Learning Centers, Student Services, Academic Success Centers, or Tutoring Centers who are seeking ways to help your students succeed through student success talks, free tutoring, or study-friendly environments. Hopefully these staff members are involved in one or more of the organizations devoted to researching such academic assistance. These organizations include the Association for the Tutoring Profession, the College Reading and Learning

Association, and the National College Learning Center Association. Using the experience and research of members of these societies, we set up U.C. Action (<http://uc.ou.edu/action>) as an initiative to 1) meet the academic needs of our student population, in biology and many other courses, and to 2) increase the retention and graduation rates at our university as a whole. I present here some ideas and tips for offering assistance to biology students and some data from our Introductory Zoology laboratory academic assistance sessions.

Background and Methods

Though some departments and colleges on our campus offered academic assistance, our administration saw the need for a more comprehensive, campus-wide program for offering tutoring across many subjects. Since the Assessment and Learning Center was already established in our University College (the college for incoming and undeclared students) to offer student success seminars and properly place students in math and English courses, that was the logical location for this new program. So, with the hiring of two, full-time staff members, the U.C. Action program was initiated in fall 2007 to follow the *Seven Principles for Good Practice in Undergraduate Education* (Chickering and Gamson, 1987). The philosophy of this program is to offer free academic assistance in a variety of subjects (focusing first on introductory courses with the highest rates of D, F, and withdraw outcomes) using faculty or graduate teaching assistants along with trained, academically gifted undergraduates to manage groups of student clientele. Our program name is based on the notion that students should take action for their own academic success, but avoids the connotation that it is only for the weak (e.g. versus a name like “Help Center”).

Our undergraduate staff of approximately 40 Peer Learning Assistants (PLAs) are trained in Socratic questioning, communication skills, recognizing learning styles, and other pedagogical methods. Their hiring is contingent upon their receiving an A in the courses with which they assist, maintaining a 3.5 or higher GPA, attending training, and often obtaining a faculty recommendation. In return, they start at \$10/hour and receive valuable skills and experience. Further, since we are a Level 1 and 2 College Reading & Learning Association (CRLA, <http://www.crla.net/itpc/>) certified program (Level 3 pending), they receive certificates after a certain number of training and student contact hours. We prefer to call our undergraduate staff PLAs instead of tutors, because the latter may convey to our clients that they give answers, lecture, or are not their equals. We seek to maintain an environment in which clients can come study (whether or not they have a specific problem or question), aren't afraid to make mistakes, will work together to teach each other, and are comfortable asking questions.



The participating faculty care about the success of their students, are given support by our office (room reservation, advertising, PLAs, advice), and reallocate two or more of their regular office hours to host their sessions. We try to maintain the same comfortable environment in faculty-run sessions as in PLA-run sessions by providing one of our PLAs to assist, discouraging lecturing, and providing a neutral environment (i.e. versus the instructor's office). Survey results suggest that students seem more likely to interact with faculty in our U.C. Action sessions than in faculty office hours because of the presence of other students and, often, a location provided by us.

During the fall 2008 and spring 2009 semesters, we facilitated an Introduction to Zoology Laboratory U.C. Action Center in response to several requests by students and faculty interest. This laboratory is a stand-alone, one-credit course serving both majors and non-majors. While the Zoology Department offers an assistance program of its own, its focus is the large, Introductory Zoology lecture course and is staffed by minimally trained undergraduates. Our U.C. Action sessions occurred once a week for two hours and were staffed on a rotating basis by the graduate teaching assistants who taught the labs, as well as one of our PLAs (a different one for each semester). In addition, the professor in charge of these laboratories attended or helped with sessions during the fall 2008 semester. The graduate assistants were given a 15-30 minute overview of our philosophy and program at the beginning of each semester. Activities during the U.C. Action sessions varied from simply being available for student questions to having series of questions printed out for students to answer as they looked at dissected organisms or microscope slides. All students using any of our U.C. Action sessions were sent the link to an online survey in the middle and at the end of each semester.

Results

Student Attendance and Correlation with Grades

U.C. Action offered assistance in over 40 subjects each semester of the 2008-2009 academic year and assisted approximately 1,500 students per semester. Over the year, our full program had over 11,000 visits for approximately 12,500 hours of assistance. The Introduction to Zoology laboratory sections had 1,171 students enrolled during the academic year, and 249 of them came for assistance during our U.C. Action Centers, for 419 total visits and 328 hours. The highest attendance occurred when structured questions and activities were provided just before exams.

While we have not been able to fully analyze visit data for all our U.C. Action sessions (i.e. removing certain covariates and using earned grades), preliminary results for Introduction to Zoology Laboratory sessions are available. Both the number of visits to U.C. Action sessions (Pearson's Correlation coefficient = 0.112, $p < 0.001$, $N = 1,171$) and total time spent at sessions (Pearson's Correlation coefficient = 0.074, $p = 0.006$, $N = 1,171$) (Figure 1) were positively correlated with final class grade.

Other Observations

Our PLAs report that students seemed to find the dissections most useful, and many crowded the microscopes early in the semester to practice with them. The laboratory professor noted that her graduate TAs often sat passively by waiting for questions from students, instead of engaging and Socratically questioning them.

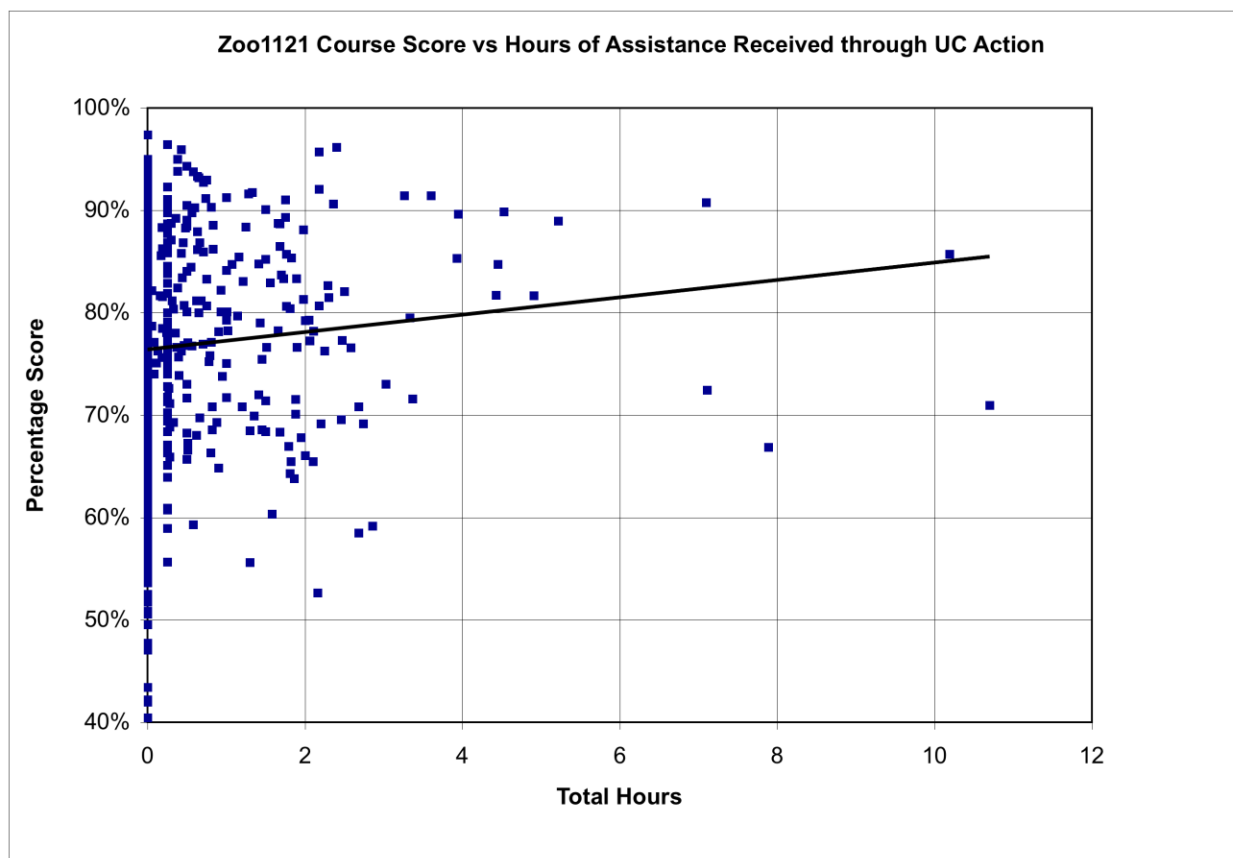


Figure 1. Scatterplot with best-fit line showing the total hours of visits by individual students to the Introduction to Zoology laboratory Action Center compared to their final percentage grade for the course.

Survey Results

We received a 13% response rate (392 of 2,915) for our fall 2008 semester surveys (mid- and end-semester) for our U.C. Action program. Thirty-three of these respondents mentioned visiting the Introductory Zoology Lab sessions sometime during that semester. Twenty-two respondents agreed or strongly agreed that the session had an atmosphere helpful for studying/questions, while one student disagreed (the rest were neutral or abstained from voting). Excepting two abstentions and two neutral votes, the remaining 29 respondents agreed or strongly agreed that they were comfortable asking the PLA questions at the sessions. The mid-semester survey indicated that most respondents agreed or strongly agreed that they would use the U.C. Action services again that semester; exceptions included one neutral vote, one abstention, and one student apparently referring to a different tutoring service in disagreeing. End-semester survey prompts of “I am satisfied with the U.C. Action program and want to see it continue” and “I believe that U.C. Action & University College are dedicated to helping me do my best academically” received agree or strongly agree responses, excepting four abstentions and one neutral vote for the latter.

For the spring 2009 semester surveys, we had a 16% response rate (367 of 2,300) program-wide; of these respondents, 29 mentioned visiting the Introductory Zoology Lab sessions. Of those who interacted with our PLA (versus the faculty member or graduate assistants), all agreed or strongly agreed

that they felt comfortable asking the PLA questions. Two respondents expressed neutrality for the prompt of “the atmosphere was helpful for studying/questions,” while the rest agreed or strongly agreed with this statement. The mid-semester survey indicated that all respondents agreed or strongly agreed that they would use the U.C. Action services again that semester; while the end-semester survey prompts “I am satisfied with the U.C. Action program and want to see it continue” and “I believe that U.C. Action & University College are dedicated to helping me do my best academically” received all agree or strongly agree responses.

The professor in charge of this laboratory noted the need for further training of her graduate teaching assistants in future semesters and wished there were a better way to get them to buy into this philosophy of learning. The PLAs further suggested that more activities be provided for clients coming to the sessions. However, all staff involved noted that because this is a mixed-majors, one-credit course, motivating students to attend extra-curricular sessions will remain a challenge.

Discussion and Recommendations

Here are some suggested steps for implementing academic assistance in your department or for your course(s):

1. Determine what is already available at your University. There may be a Learning Center, Student Support Services, or Writing Center that already hires and trains tutors, and you’ll just need to volunteer to run a session for your department through them. For a full list of what these centers may be called, see <http://www.pvc.maricopa.edu/~lsche/about/names.htm> (Names of Learning Centers, 1998). Alternatively, another department might already have a program in place for their students that you could emulate or with whom you could share management and resources (for hiring, tutor training, advertising, visit tracking, etc.)
2. Whether or not something else is available on your campus, you should survey your population to gauge student (client and tutor) and faculty interest in participating in a future academic assistance program for your department or course(s). Use the results to inform your decisions, as described below.
3. Define your goals and determine your needs, including faculty time (we start faculty with two hours, one evening per week), classroom seating, which courses are high-risk or would receive the most visits. In addition, determine whether sessions should be walk-in and/or by appointment; one-on-one and/or small group; and face-to-face and/or online. Outline the overview of a setup that could meet your needs, along with an assessment plan that will help you measure progress toward your goals.
4. Put together a proposal to request department, faculty, and/or higher administration support (financially, for space, and for advertising). Your proposal could ask for anything from a fully self-starting, self-funded program in your own lab space to large sums of money to adopt a third-party, online tutoring service for your subject. For ideas on funding sources, see the Appendix.
5. Assemble everything you need as you lead up to an inaugural semester: reserving space, recruiting staff, marketing, putting together program missions, compiling a tutor training manual (for more information, see the Appendix below), deciding how to assess program success (we use TutorTrac, <http://www.tutortrac.com>, for tracking visit data and making appointments), setting up online tutoring (we use Adobe Connect Pro to allow webcam/microphone and shared-whiteboard interaction), and whatever else applies to your situation.
6. Be sure to carry out your assessment plan, both so you can document the success of your program to administrators and to allow you to improve your program. The immediate goal is to help your

students succeed in your class, but ultimately your goal should be to grow students' critical thinking skills to help them throughout college and their future careers. If you really get into it, there are journals that publish this sort of research (see the societies list in the Appendix), along with annual conferences where you can learn more and/or present your experiences.

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About the Author

Mark Walvoord received his Masters degree in Zoology from the University of Oklahoma (OU) in 2002 in herpetology. His research also included a herpetological survey in the rainforest canopy of Madagascar, and he continues to do research pertaining to academic assistance and undergraduate biology education. Working for the Zoology Department at OU gave him experience in running a department-specific academic assistance program, advising, teaching, and doing research in electrophysiology of scorpions. After a two-year student services job in the Chemistry Department at UNC-Chapel Hill, he returned to OU as the Assistant Director of the Assessment and Learning Center to help implement and manage their new comprehensive, academic assistance program.

Appendix

Resources Concerning Academic Assistance

An expanded version of the handout from the mini-workshop presentation.

Professional Tutoring Organizations

- National College Learning Center Association (NCLCA), <http://www.nclca.org>
- Learning Support Centers in Higher Education (LSCHE), <http://www.pvc.maricopa.edu/~lsche/>
- College Reading and Learning Association (CRLA), <http://www.crla.net/>
- The Association for the Tutoring Profession (ATP), <http://www.myatp.org/>
- National Tutoring Association (NTA), <http://www.ntatutor.com/>

Tutor Tracking Software

- TutorTrac, <http://www.tutortrac.com>
- AccuTrack, <http://www.accutrack.org>

Ideas for Funding

- NSF (e.g. programs through Educational Research Initiatives, Research on Learning & Education, Centers for Learning & Teaching)
- Corporate grants (especially for public schools)
- Student fees
- General fund (provost grants our funding from general university funds)
- Charge students at the door

Tutor Training Resources

Crossroads of Learning. 2006. Tutoring Foundations: A complete on-line tutor training program.

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