The Learning Assistant (LA) Model at CU

The Learning Assistant program (developed at the University of Colorado) uses large-course transformation as a mechanism to achieve these four goals:

1. Recruit and prepare talented science majors for careers in teaching
2. Improve the education of all science and math students (K-16)
3. Engage science faculty more thoroughly in the recruitment and preparation of future teachers
4. Transform cultures in science departments to value research-based teaching as a legitimate activity for ourselves and for our students

What do LAs do? What is their experience?

The exact way that LAs are used can vary across departments and even courses within a department. LAs function as peer teachers; thus some models can look very similar to Peer-Led Team Learning (PLT) or Supplemental Instruction (SI). Weekly, students commit about 10 hours to being an LA - this includes the education course they take. Each LA receives a $1500 stipend for the semester. Overall activities relate to content, pedagogy, and practice, as illustrated below.

- **Content:** Weekly planning sessions with science faculty member who is teaching the course
- **Practice:** LAs lead weekly learning teams of 15 to 30 students. As provide formative feedback for instructor to use in the course

PedAGogy: LAs from all departments take a weekly course in science education theory and practice. The course is taught by an Education faculty member in a 1-2 hour lecture.

Student in mostly traditional courses

Applies to be a Learning Assistant

PedAGogy: Students transformed STEM course or was formerly in the course.

PedAGogy: Math and Science Education course

PedAGogy: Begin taking education courses.

Noyce Fellow

PedAGogy: Must be enrolled in teacher certification program

K-12 Math or Science Teacher

PedAGogy: Leads weekly learning teams of 15 to 30 students. As provide formative feedback for instructor to use in the course

PedAGogy: LA students reflecting team teaching and content

Semester in LA Program

0 1 2 3 4

K-12 Math or Science Teacher

Student in mostly traditional courses

Learning Assistant

Math and Science Education course

Noyce Fellow

Student -Student Interactions

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Real and Potential Impacts on the Chemistry Teaching and Learning Pipeline

Recruiting students into K-12 teaching careers

Enrollment of Chem/Biochem Majors in Certification Programs

Of the 49 Chemistry Learning Assistants:
- 1 is a dual master's/ certification program
- All are currently Noyce fellows (will be chemistry teachers)
- 1 is teaching in private school
- 4 are 3rd year regents (will be high school teachers, and they will have a stronger chemistry background)
- 1 has been accepted in the Graduate Education Program in the Harvard Graduate School of Education
- 1 is attending graduate school in Chemistry in Fall 2009
- All 3 have applied to Teach for America

Did you know . . . fewer than 40% of high school chemistry teachers have a degree in chemistry?

Impacts on General Chemistry I Students (Fall07: No use of LAs)

Fall 2007 and Fall 2008 provide the best semesters to compare effects of the use of LAs in CHEM 1111. Both semesters were taught by the same faculty members, the same recitation materials were used (with slight modifications), and TAs went through the three-day enhanced TA training prior to each semester. Since LAs were used in Fall 2008, joint TALA recitation meeting were held each week. An additional difference is that in Fall 2008, six of the 24 TAs were foreign-born, and a few struggled to communicate with students.

Students learned more in Fall 2008

Students learned more in Fall 2008

Time spent working with other students in recitation

Ages 5-20 years

20 years

Learning Styles or General Survey (LOCNESS in 2009: 152, in 2008: 108)

Some student feedback about working with LAs

Most would choose to take a course that had LAs over one that does not. Many say the LA helps them to understand chemistry, and that motivates them to want to learn more. Many suggest that we use more than one LA in recitation and that they stay for lab.

Additional Impacts

On LAs (some of whom will become K-12 teachers):
- Increased pedagogical sophistication
- Increased knowledge content knowledge
- Better questioning skills; more confidence teaching
- For Noyce fellows, research and curriculum design experience for some, chemistry education content

Use of undergraduate LAs with graduate TAs in recitation enhances the collaborative learning environment. In our model, LAs:
- Attend the Mathematics and Science Education Seminar
- Write weekly reflections (which we use to improve materials or inform TAs and LAs in future semesters about student difficulties and strengths - these were worked on
- Attend Gen Chem lecture (and work with students during “dicker” questions)
- Attend a weekly recitation meeting (with TAs in which they work collaboratively on the next week’s recitation materials and discuss strategies for dealing with possible student difficulties.

Use of LAs and TAs to facilitate collaborative learning environments

Although the laboratory room is not optimal physical space, LAs and TAs are able to facilitate collaborative learning in recitation. Use of tools such as whiteboards helps make students thinking visible to each other and to the TAs and LAs. Recitation materials have been developed to focus on developing student understanding of chemistry concepts, use of multiple representations, problem-solving, and whenever possible, connecting chemistry to real-world and biological applications. TAs and LAs jointly attend a weekly recitation meeting that focuses on the content, pedagogy, and student thinking.

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