

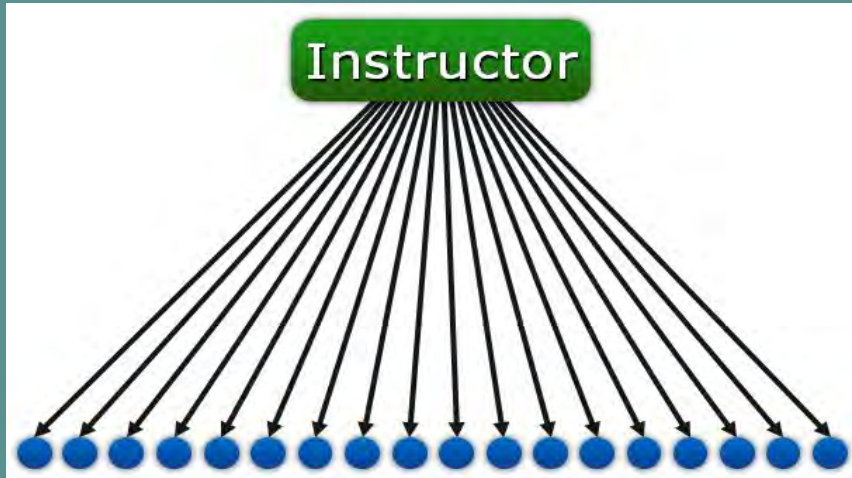
TRANSFORMING UNDERGRADUATE EDUCATION WITH A LEARNING ASSISTANT MODEL



Learning Assistants are undergraduate students who, through the guidance of *weekly preparation sessions* and a *pedagogy course*, facilitate discussions among groups of students in a variety of classroom settings that encourage active engagement.

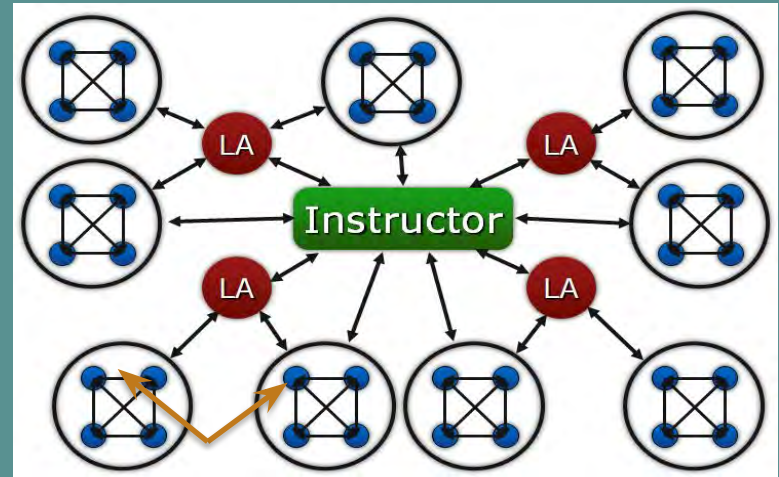
GENERALIZED MODEL OF TRANSFORMATION WITH LAs

Traditional



Students

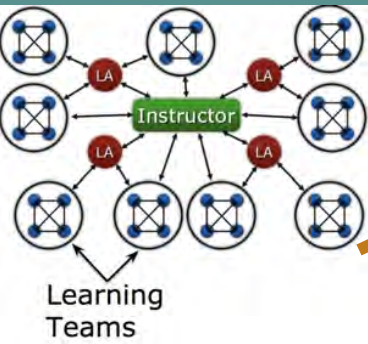
Transformed with LAs



Learning Teams

FOUNDATIONS OF THE LA EXPERIENCE

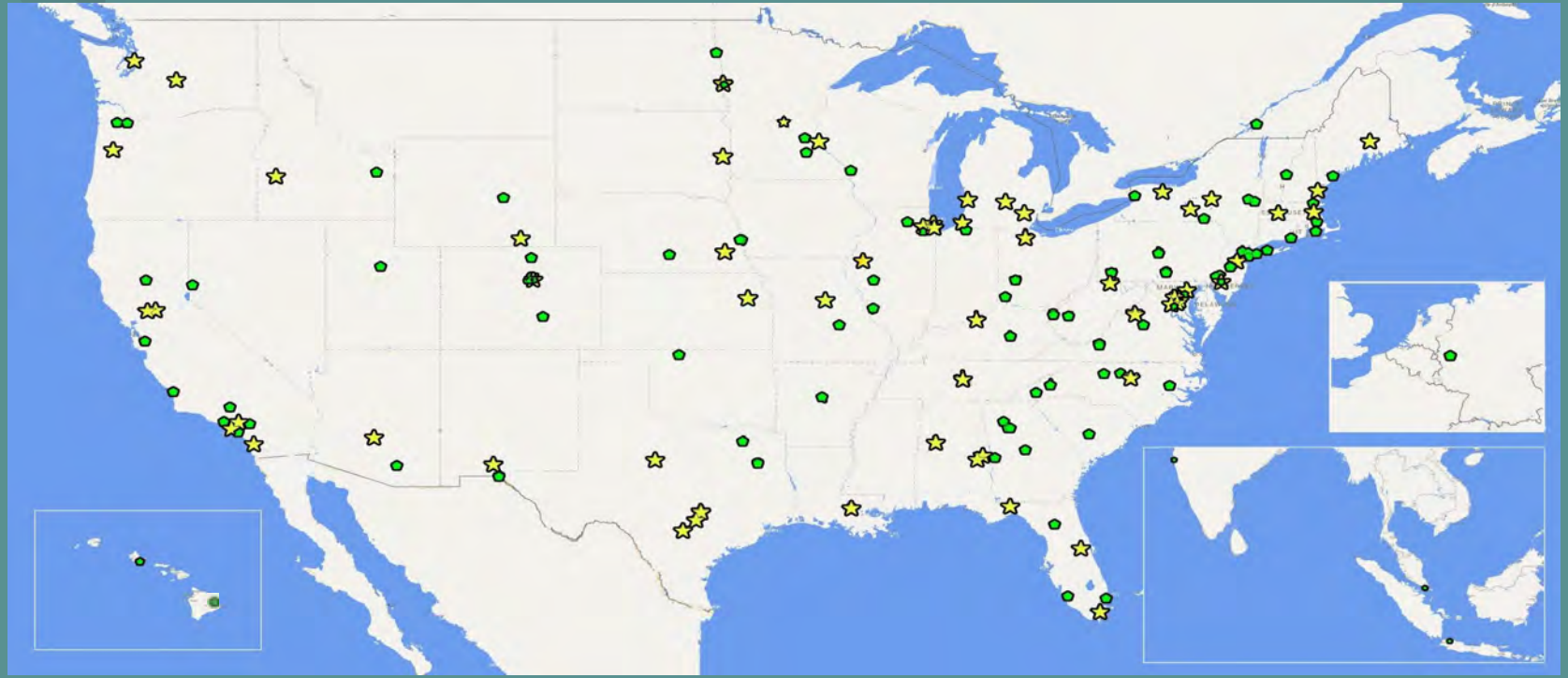
Practice: Lead Learning Teams



Content: Weekly
Prep Meeting

Pedagogy:
LA Course

International Learning Assistant Alliance: 1,030 faculty/staff from 324 Institutions

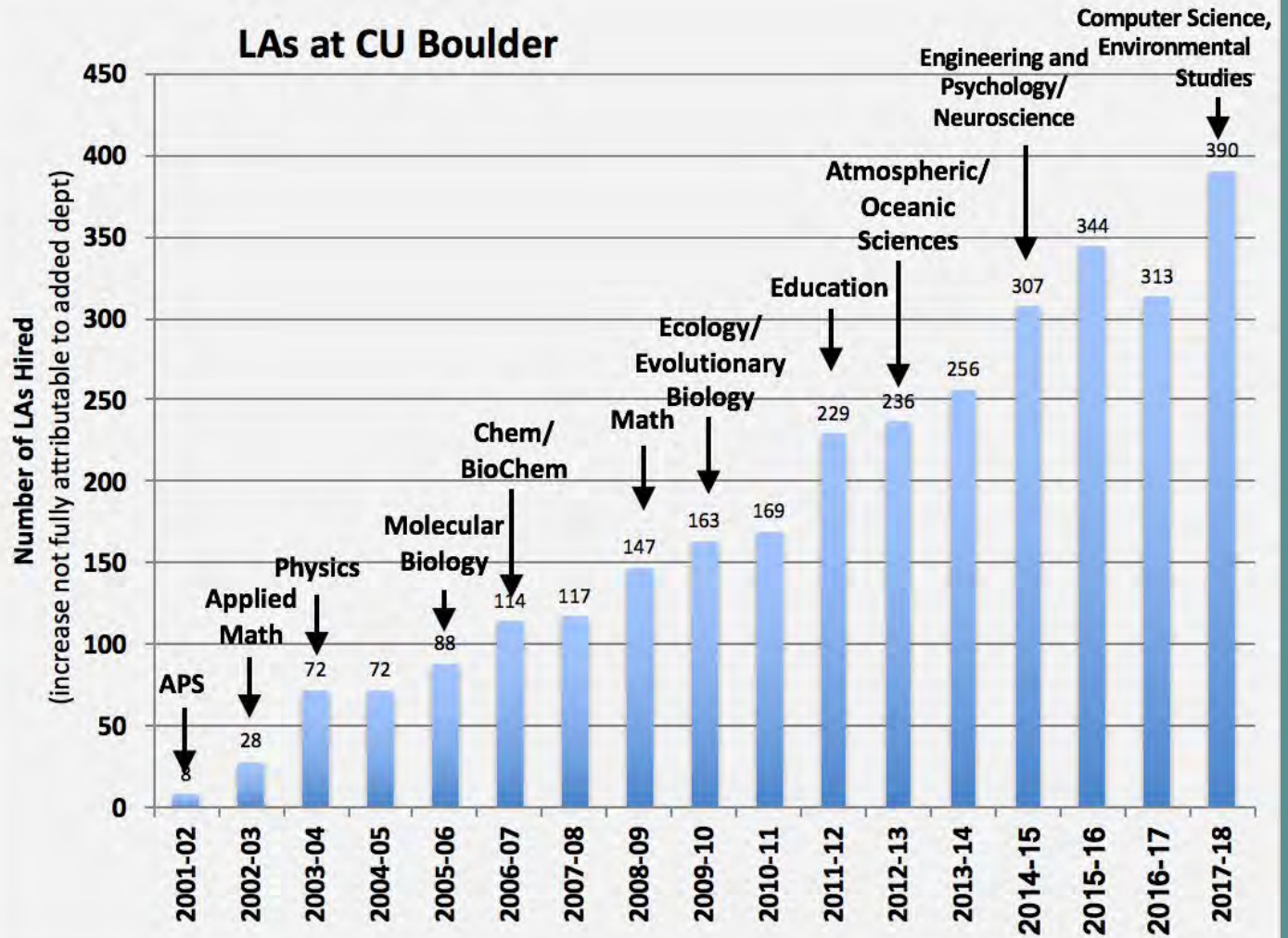


learningassistantalliance.org

MAIN GOALS

1. **Curriculum & Course Transformation:** to engage and support faculty in making transformations to their courses to improve the quality of education for undergraduates.
2. **Teacher Recruitment & Preparation:** to recruit and prepare talented math, science, and engineering majors for careers in teaching.
3. **Institutional Change:** to transform departmental cultures to value research-based teaching for ourselves and for our students.
4. **Discipline-Based Education Research:** to continually measure the outcomes of our transformations.

LAs at CU Boulder



In the last ten years, a lot of research has been conducted and disseminated about the ways in which active learning can make students in the natural sciences learn more effectively.

What is lesser known is that this same research has also been conducted in the Social sciences, with researchers coming to very similar conclusions: when college students actively engage with course materials, they learn the material better.

DEVELOPING A UH SYSTEM LA PROGRAM

The background is a solid teal color. It features several decorative elements: a large, semi-transparent pie chart in the upper right quadrant; several smaller, semi-transparent pie charts scattered in the upper right and middle right areas; and a semi-transparent bar chart in the bottom right corner with four vertical bars of increasing height from left to right.

*Phase 1: UH Manoa - UH Hilo LA Program
Structures Spring 2018*

SPRING 2018 UH LA-SUPPORTED COURSES

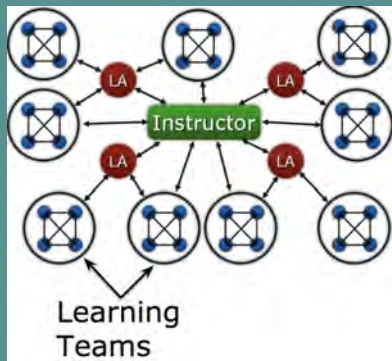
UH Manoa

Course	Enrollment	LAs
Chem 162	203	5
Math 100	262	3
Math 161	57	2
Math 203	75	2
Math 134	116	5
Phys 151	224	3
Phys 152	146	2
TOTAL	1083	22

UH Hilo

Course	Enrollment	LAs
Math 121	133	2
Phys 170	54	2
Phys 272	44	2
TOTAL	231	6

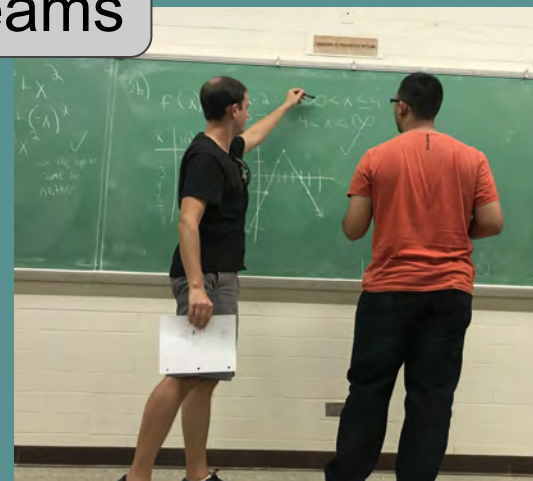
UH Manoa



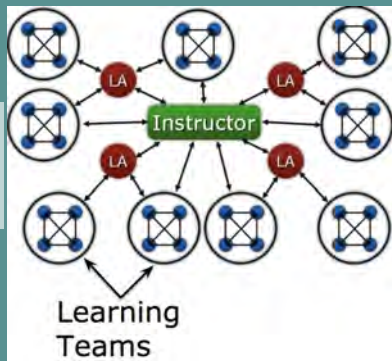
MATH 100

Practice: Lead Learning Teams

MATH 134



UH Manoa



PHYS 152

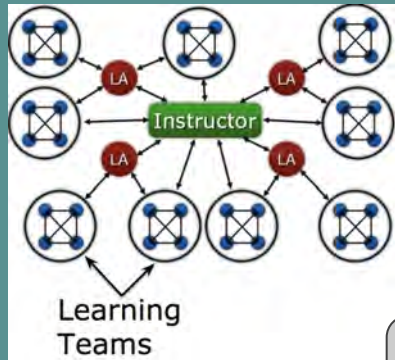
Practice: Lead Learning Teams

CHEM 162



PHYS 151

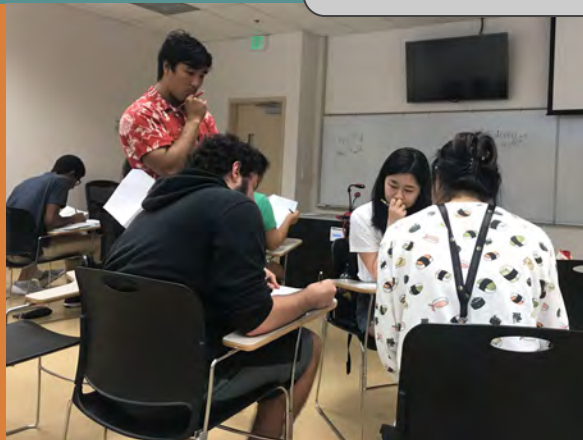
UH HiLo



PHYS 272

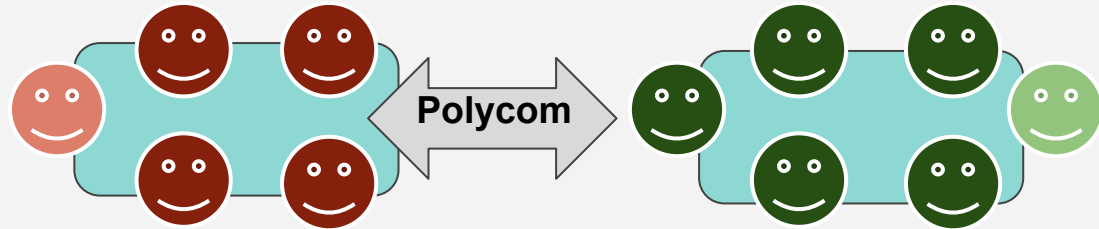
Practice: Lead Learning Teams

PHYS 170



JOINT MANOA / HILO

Pedagogy: LA Course



Hilo

Manoa

Monday Face-to-Face Section



Online Section

Readings
Activities
Teaching reflections
Mid-Semester LA Feedback

Sample Topics:
Growth mindset
Questioning
Facilitating groups

Student ideas
Metacognition
Mental models



DATA FROM QR MATH PILOT PROGRAM

(Fall 2017, Spring 2018)

PILOT PROGRAM STRUCTURE

Math 100

2 large lectures + one recitation (break-up groups of 60 students, one TA and 2 LAs). Spring 2018, 5 recitations.

Math 161

Taught by a TA. Hybrid format of lectures and active learning. Two LAs. One section.

Math 203

Hybrid format of lectures and active learning. One LA per section. Two sections.

Math 100 (Fall 2017 LA pilot results)

Two instructors: Section 1 with LAs, Section 2 without LAs.

Both instructors used the same material, exams and grading scheme.

Math 100 Section	% of A and B	% of Failing (D-Fs)	%Ws
Section 1: without LAs	69% (9.2% A+)	8%	4%
Section 2: with LAs and one lecture transformed into a recitation a week	72.3% (22 % A+)	5.5%	2.4% (3.4% S2018)

Results: LAs lower the rate of failing and dropping, and at the same time increase the rates of A+. In addition to addressing concerns of retention and passing, this is evidence that the LA-supported course also provides a better environment for our best students.

Math 100:Recitation

Average Student Scores:

Online homework: ~80%

Recitation worksheets: ~98%

Recitation Materials:

- More difficult than online homework
- Designed summer 2017
- Iterations in Spring 2018 by the instructor and TAs



MID-SEMESTER STUDENT FEEDBACK FOR MATH 100 LA

LA FEEDBACK



“Gives examples that relate to the concepts”

“Allows me to figure out the problem on my own and guides me through the parts I don't understand.”

Math 203 (Fall 2017 LA pilot results)

Same instructor for three semesters.

Semester	% of A and B	% of Failing (D-Fs)	%Ws
Fall 2016 (no LAs)	32%	31%	12%
Spring 2017 (no LAs)	33%	37%	17%
Fall 2017 (LAs)	40%	19%	7% (5.3%, 10.8% S2018)

MATH 203: RECITATION

Recitation Materials:

- Designed Summer 2017
- Iterations in Spring 2018 by same instructor



The class is now based on best practices of **active learning**, students are engaged and participate actively in the learning process.

QUOTES

“Our LA is great. We **bonded** with him on the first day of class. We were just talking about how he is really good at **coaching** us instead of telling us the answer directly.” **Student, Math 100**

“The best part of having LAs is the ability to **reach each student** in class and provide them with **daily feedback**. The class is now designed with an important active learning component which highly benefits the students.” **Instructor, Math 203**

“With all the lessons from the **pedagogy** work, I have become more conscious of the techniques I have learned and my actions. Overall, I feel this change in the LA system for me will **help me to grow** with the greater work and challenges there are now than before.” **LA, Math 134**

UHM: Chem 162 (Spring 2018 LA pilot in progress)

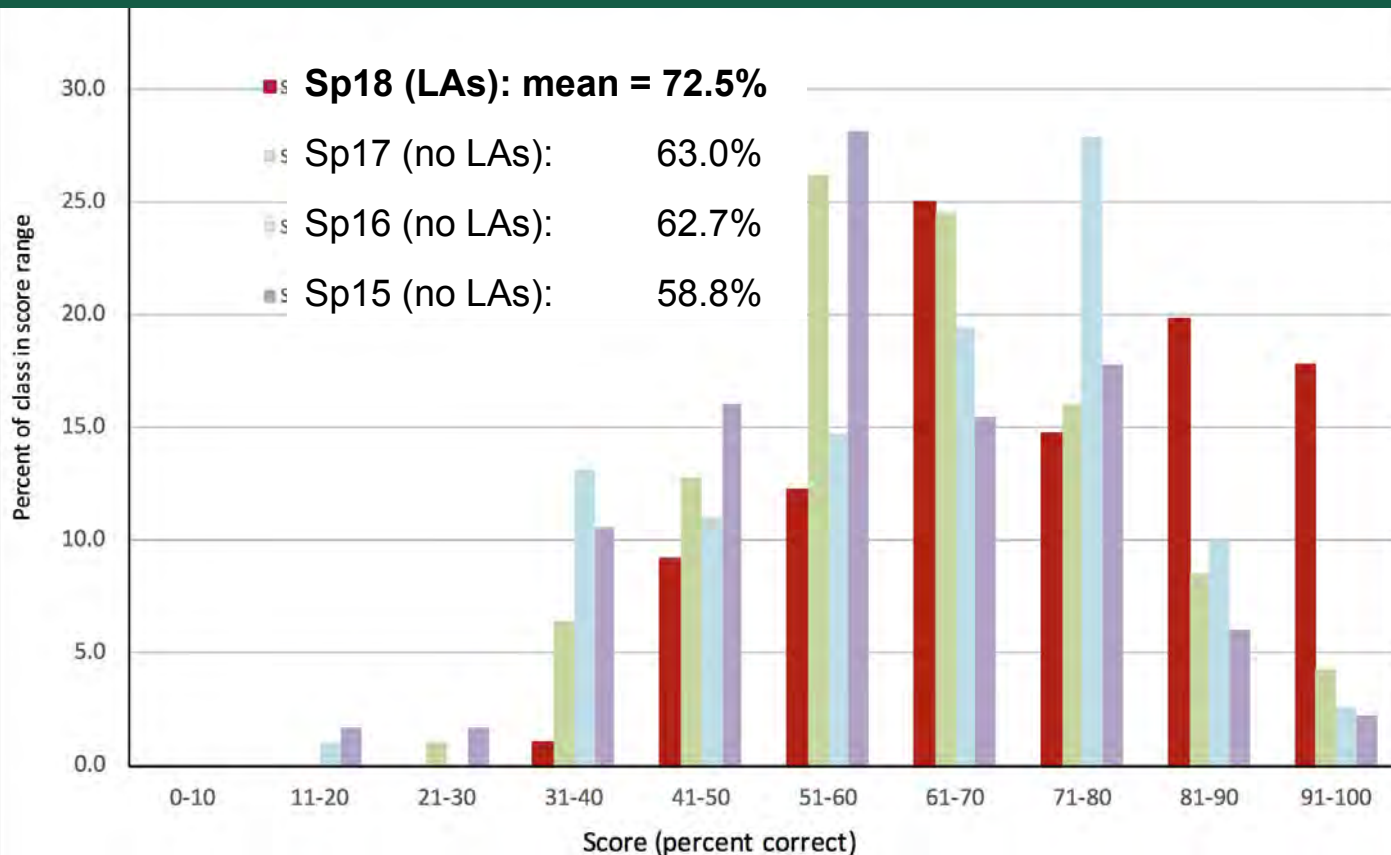
Instructor A: Teaching two sections without LAs. Three 50-min lectures.

Instructor B: Teaching one section with LAs. Three 50-min lectures, plus students attend a 50-minute discussion section facilitated by a TA and LA. (2 TAs, 5 LAs)

Both sections are using the same exam questions.

Chem 162 Section	Exam 1 (mean)	Exam 2 (mean)	Exam 3 (mean)	Final Exam (mean)
1: No LAs (n = 148)	68.6%	49.1%	TBD	TBD
2: No LAs (n = 154)	68.6%	49.1%		
3: LAs (n = 187)	72.5%	56.5%	TBD	TBD

UHM: Chem 162, Exam 1 scores (Instructor B)



UHM: Phys 151 (Instructor 1)

Spring 2014: No LAs.

Spring 2017: Three LAs. (Instructor's third full semester using LAs.) LAs facilitate in-class active learning in lecture (~20% of time) and run help room sessions.

Both final exams were multiple-choice, 100 possible points.


Many questions were identical.

Semester	Final Exam (mean)	Final Exam (median)
Spring 2014 (no LAs)	52.0%	50.0%
Spring 2017 (3 LAs)	56.5%	57.0%

LA ANNOTATIONS OF PEDAGOGY READINGS

When I think of the phrase "teaching right", I think of students learning. I have to agree with the author that learning and teaching can't be separated. I do understand that it is up to the student to pay attention and be motivated, but how can someone be a good teacher if there is no learning going on?

How can we understand what knowledge our students have? Or, what do we need to do to understand what they know so that we can design our instruction more appropriately? Every student has a different need, so they may need a different approach. There may be a number of ways to go about this that some may not agree to while others do.

? I have definitely  seen both types of students, but I am surprised to find similarities in myself with the examples given. This reading is not only helping me be a better LA but a better student.

CK



REMARKS

- We are working closely with the College of Education on ways to bridge the LA program and the pedagogy course between their college and Natural Sciences.
- Two current LAs are intending to become teachers in secondary education.
- The LA Program will create pathways to other existing programs at UHM such as “The Learning Assistance Center (LAC)” and “The Learning Emporium.” The training that LAs receive will support them as they are hired into other peer learning roles at UH.
- The LA Program will develop connections and leverage existing faculty development resources, such as the Center for Teaching Excellence.
- The LA program develops a community based classroom environment.

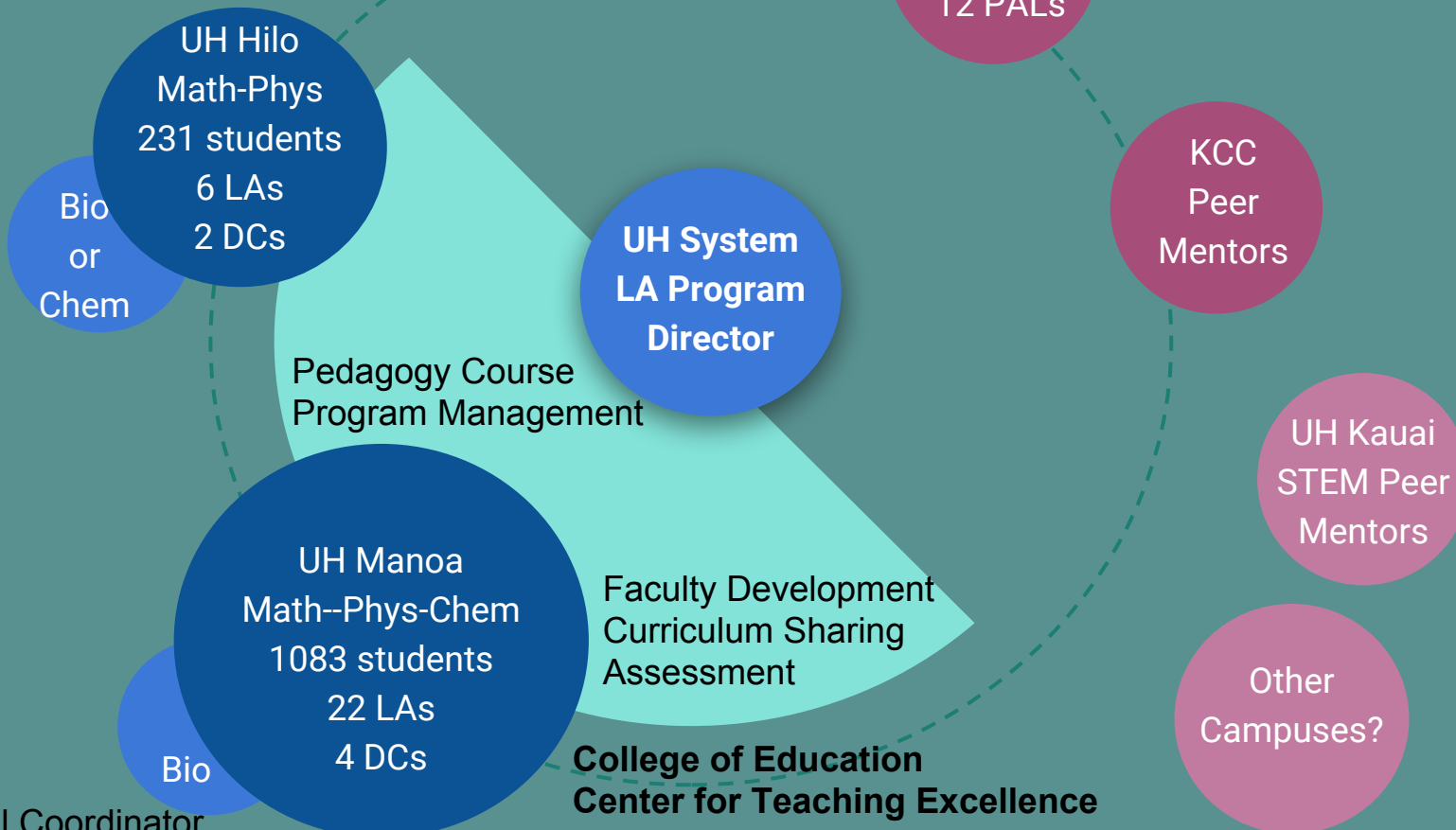
Phased Development of UH System LA Program

Phase 1:
Spring 2018

Phase 2:
Fall 2018
Spring 2019
Fall 2019
Spring 2020

Phase 3:
Fall 2020
Spring 2021

Phase 4





STEPS

1. Build organizational structures, including a network of faculty and Departmental Coordinators;
2. Fully develop the multi-campus pedagogy course;
3. Develop timelines and processes for evaluating faculty requests and recruiting and hiring LAs;
4. Engage in faculty development;
5. Iterate on current uses of LAs; expand LAs to new courses and departments;
6. Partner with the College of Education to recruit LAs into K12 teaching;
7. Connect to other programs on each campus to leverage existing resources and maximize the impact of investing in the LA Program;
8. Analyze additional data for outcome measures such as student learning, success, and retention.

LA Central Campus-Wide Electronic Administration Tool

LAA

Learning Assistant Alliance

Home

LA Central

LASSO

Resources

? | (0) |

Hiring | My Program

Clear Filter

Filters

Search:

Learning Assistants

Manage LA Central Settings

Program Communication Tools

LAA Communication Tools

Dept. ^	Name	Status	LA Positions	Dept Applicants	Hires	Hiring Completed
▶	Applied Math	In Progress	18	71	0	0
▶	Germanic and Slavic Languages and Literatures	In Progress	2	3	0	0
▶	APS Astrophysical & Planetary Sciences	In Progress	8	31	0	0
▶	ATOC Atmospheric & Oceanic Sciences	In Progress	12	26	0	0
▶	CHEM Chemistry & Biochemistry	In Progress	27	92	0	0
▶	EBIO Ecology & Evolutionary Biology	In Progress	13	12	0	0