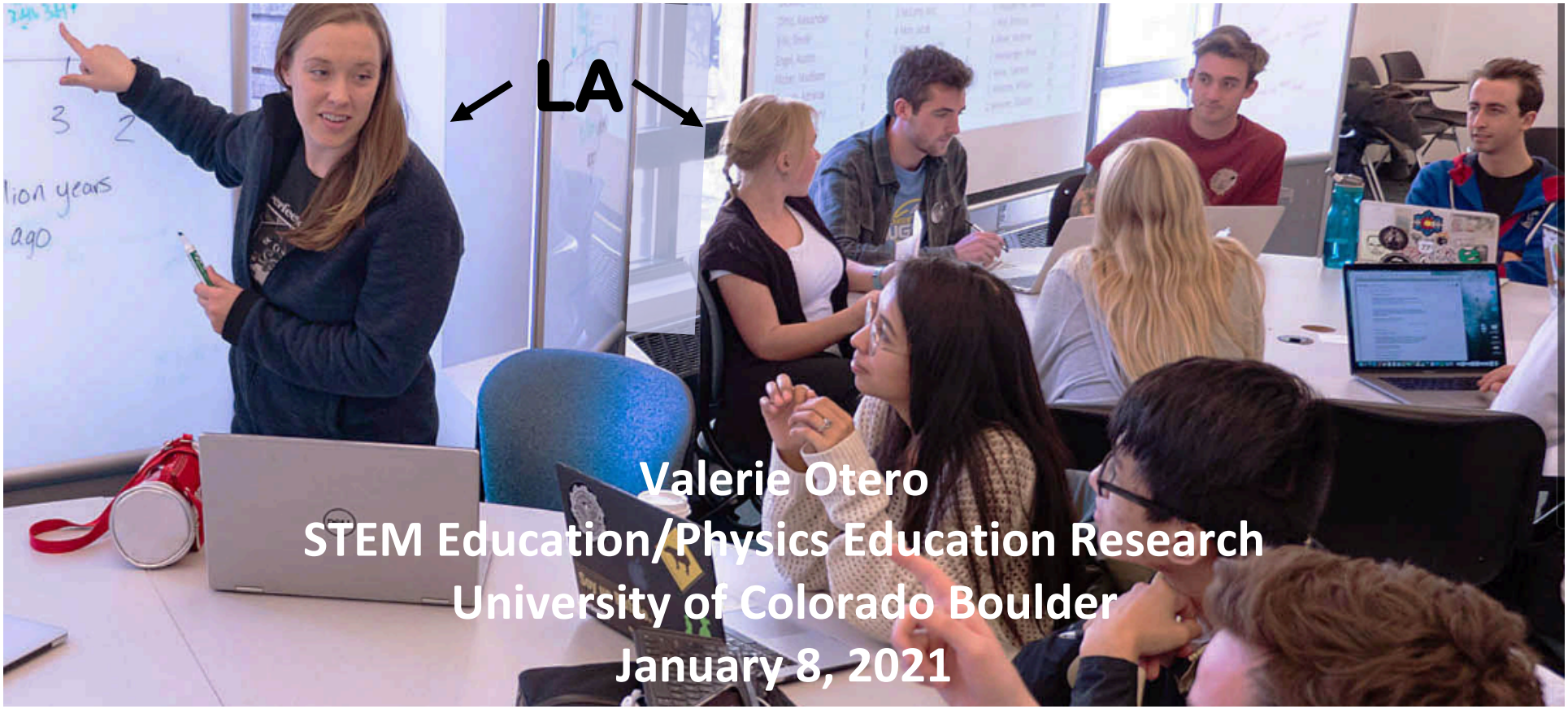
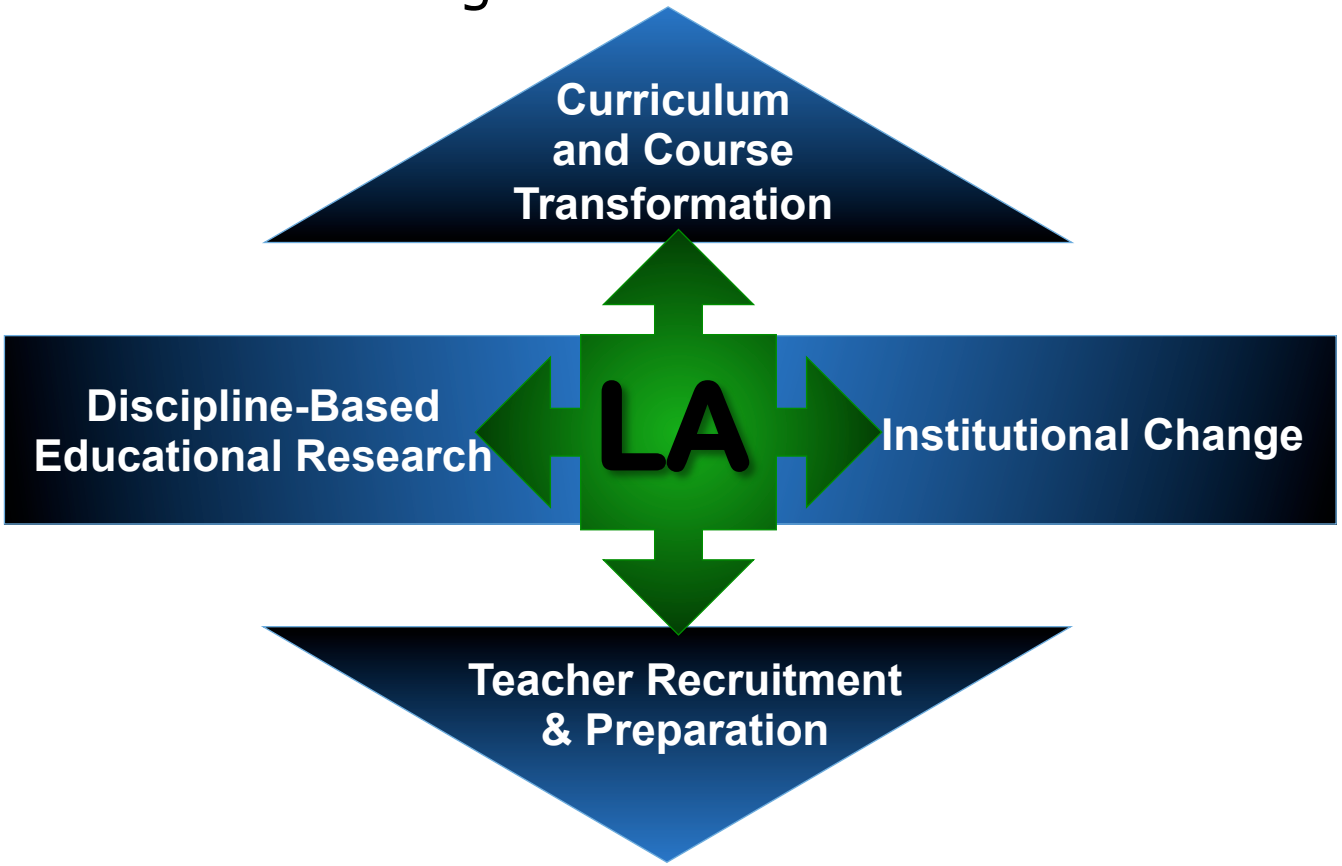
Learning Assistant (LA) Model and It's Impacts: Beyond pedagogical content knowledge



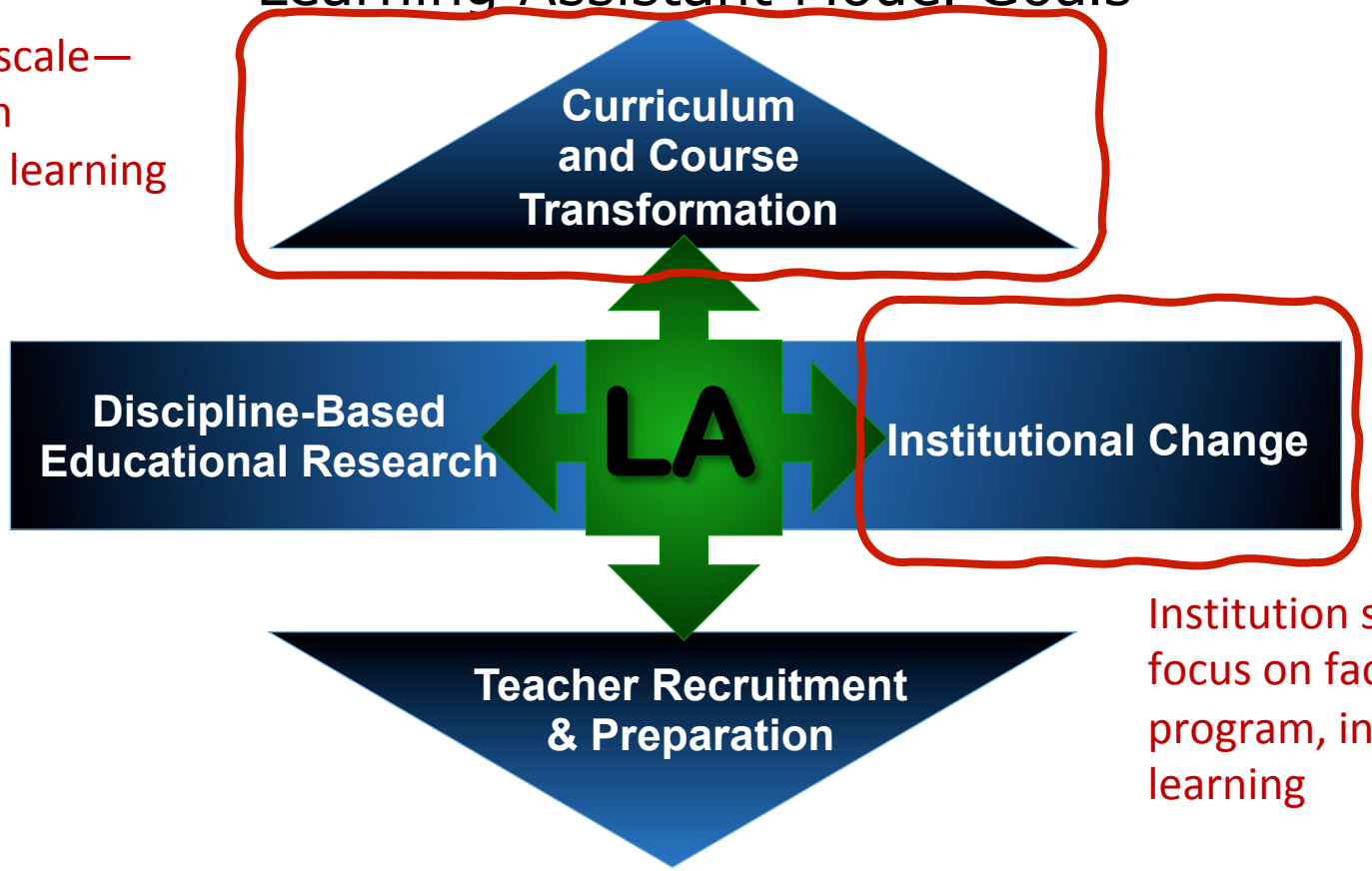
Valerie Otero
STEM Education/Physics Education Research
University of Colorado Boulder
January 8, 2021

Learning Assistant Model Goals

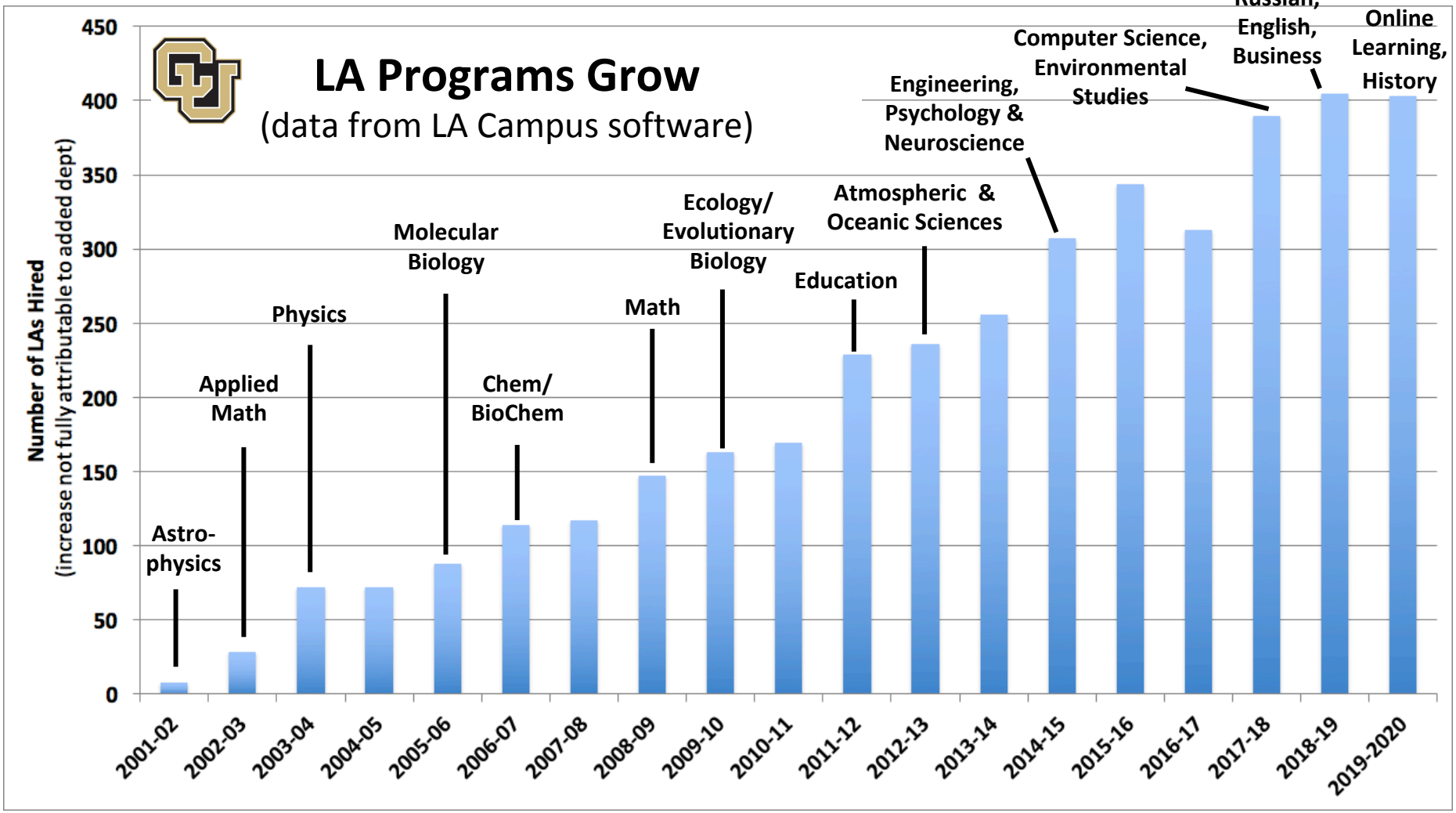


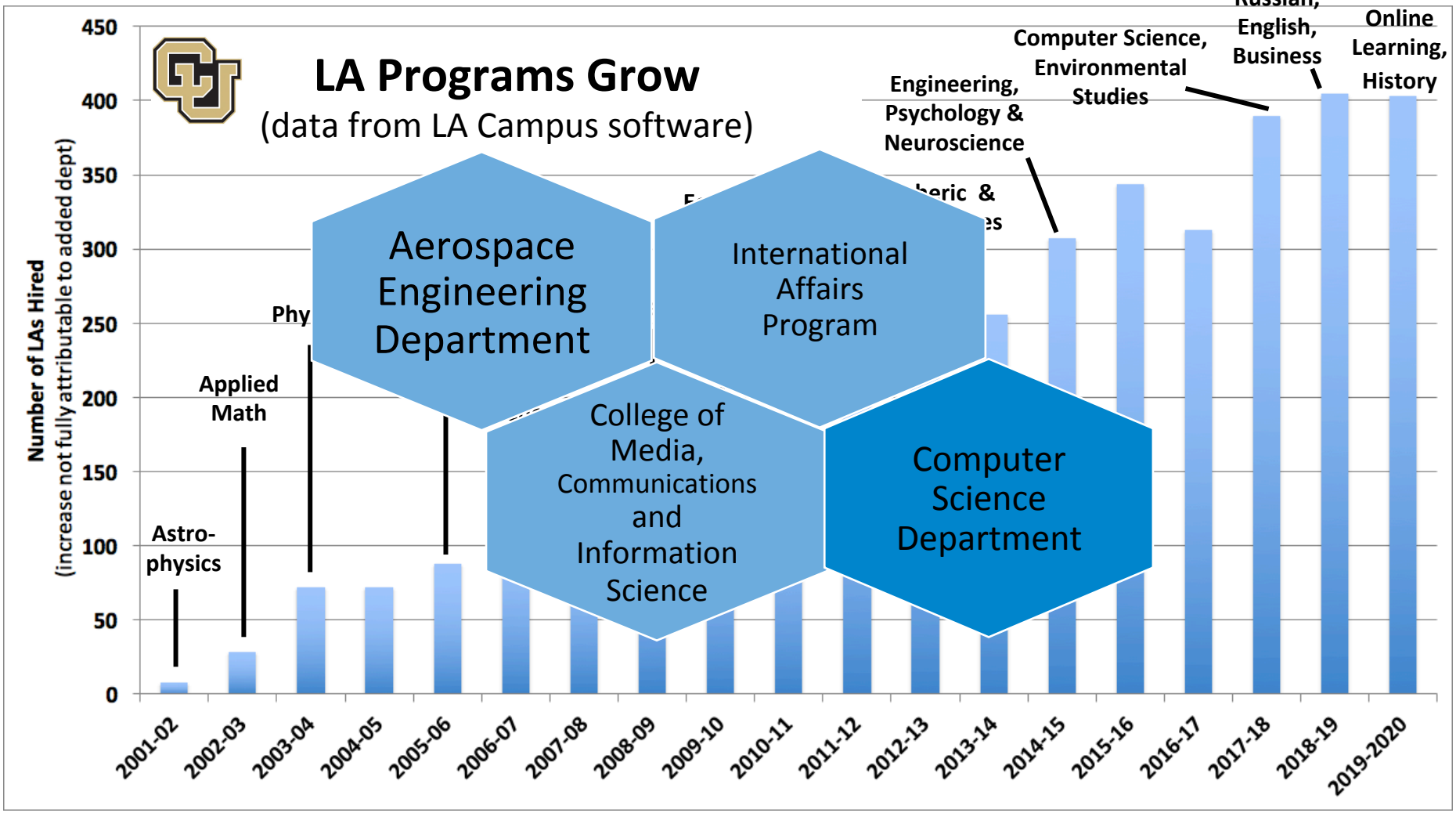
Learning Assistant Model Goals

Course scale—
focus on
student learning



Institution scale—
focus on faculty,
program, institutional
learning


LA Programs Grow
(data from LA Campus software)
Number of LAs Hired
(increase not fully attributable to added dept)
450
400
350
300
250
200
150
100
50
0
Astro-physics
Applied Math
Physics
Molecular Biology
Chem/ BioChem
Math
Ecology/ Evolutionary Biology
Education
Atmospheric & Oceanic Sciences
Engineering, Psychology & Neuroscience
Computer Science, Environmental Studies
Russian, English, Business
Online Learning, History
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-2020


LA Programs Grow
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Number of LAs Hired
(increase not fully attributable to added dept)
450
400
350
300
250
200
150
100
50
0
Astro-physics
Applied Math
Phy
Engineering, Psychology & Neuroscience
Computer Science, Environmental Studies
Russian, English, Business
Online Learning, History
Aerospace Engineering Department
International Affairs Program
College of Media, Communications and Information Science
Computer Science Department
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-2020

Content: As part of the **Instructional Team,** LAs connect students to faculty and connect faculty to pedagogy & educ. research.

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Practice: In disciplinary courses, **LAs relate to students**, care about them, help them learn and adapt as students themselves.

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Pedagogy: In **weekly pedagogy course** LAs become advocates, inclusive educators, and mentors.

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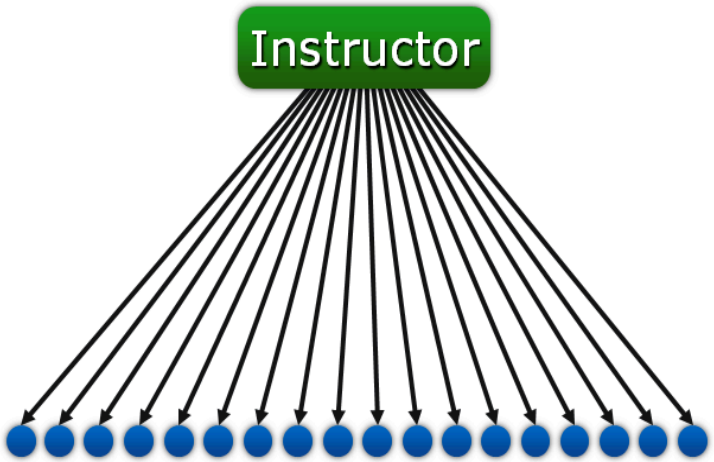
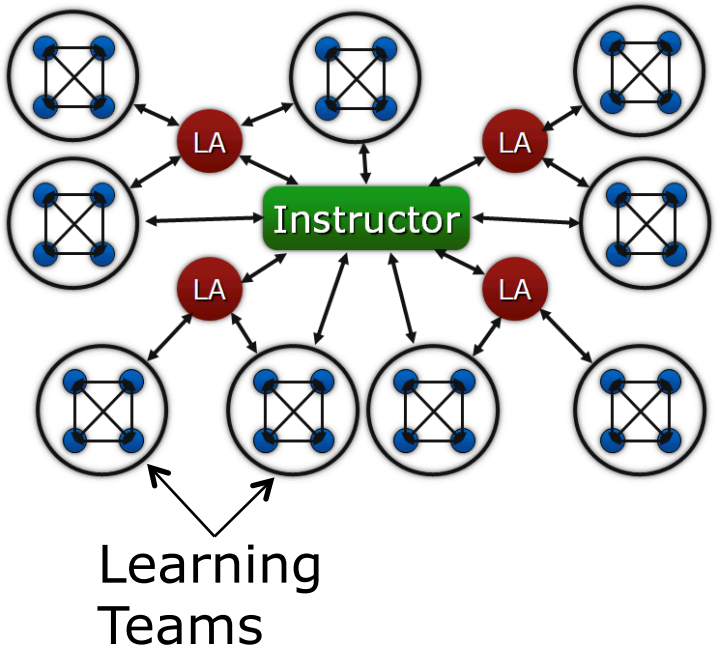
Generalized Model of Transformation with LAs

Traditional

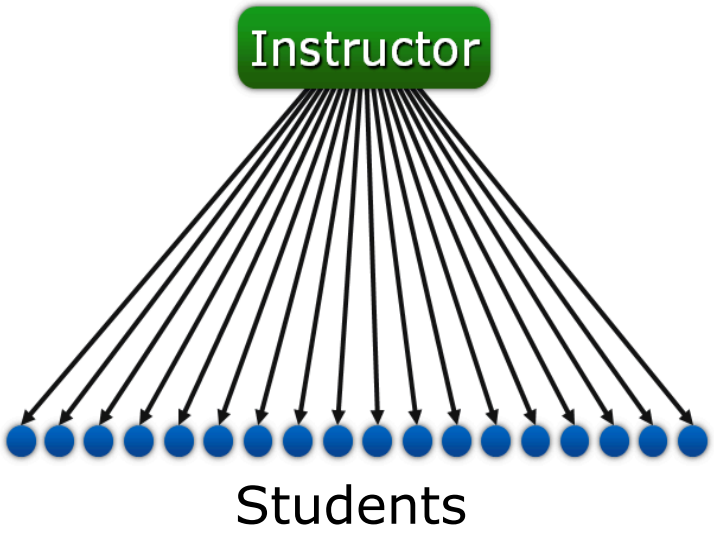


Transformed with LAs

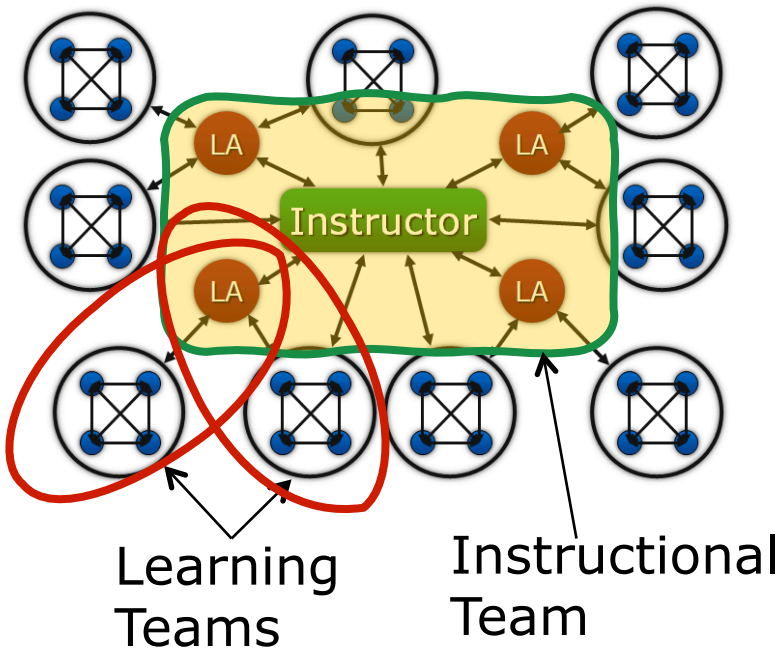


Generalized Model of Transformation with LAs

Traditional

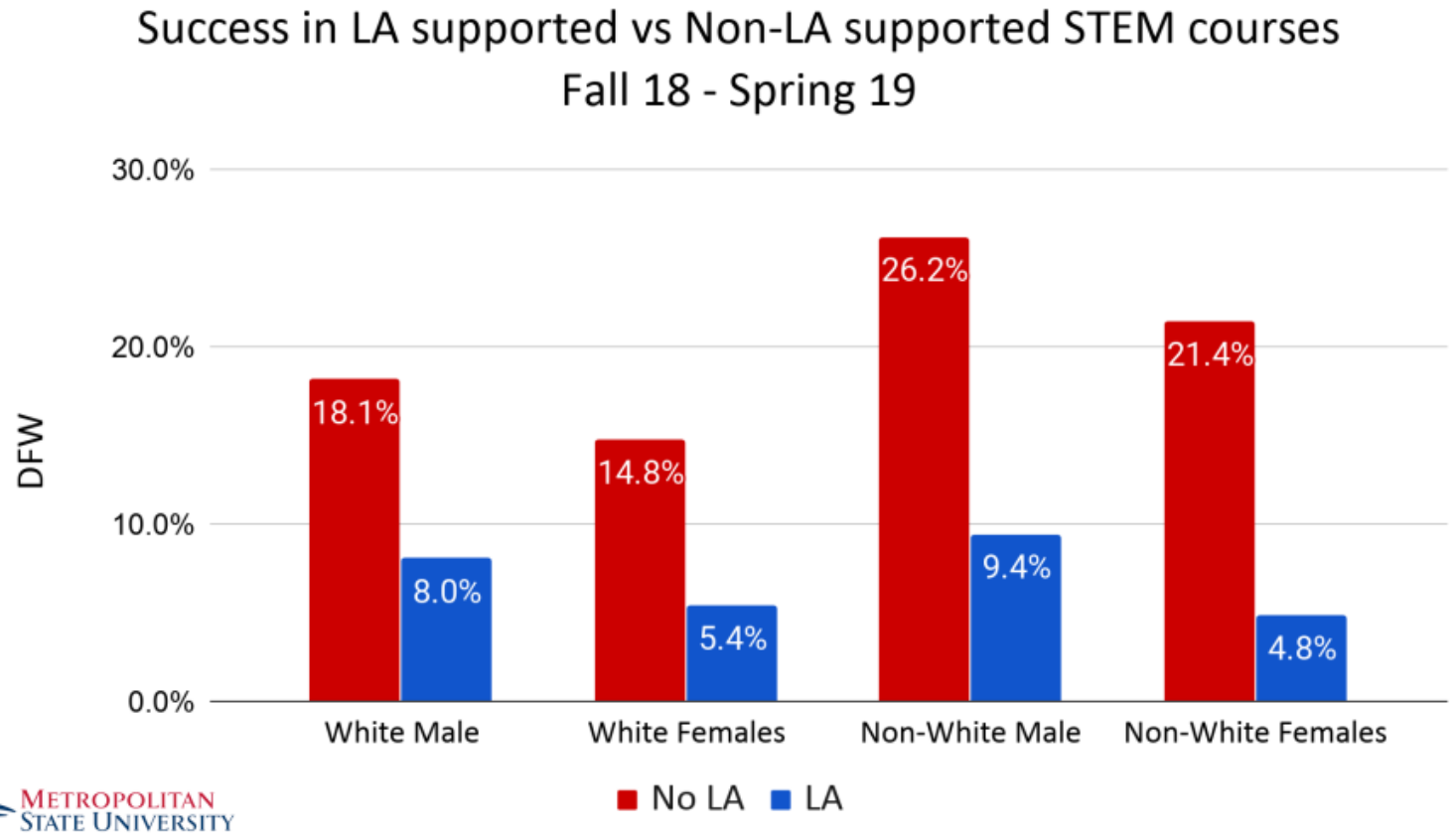


Transformed with LAs



The LA program has shown a variety of impacts:

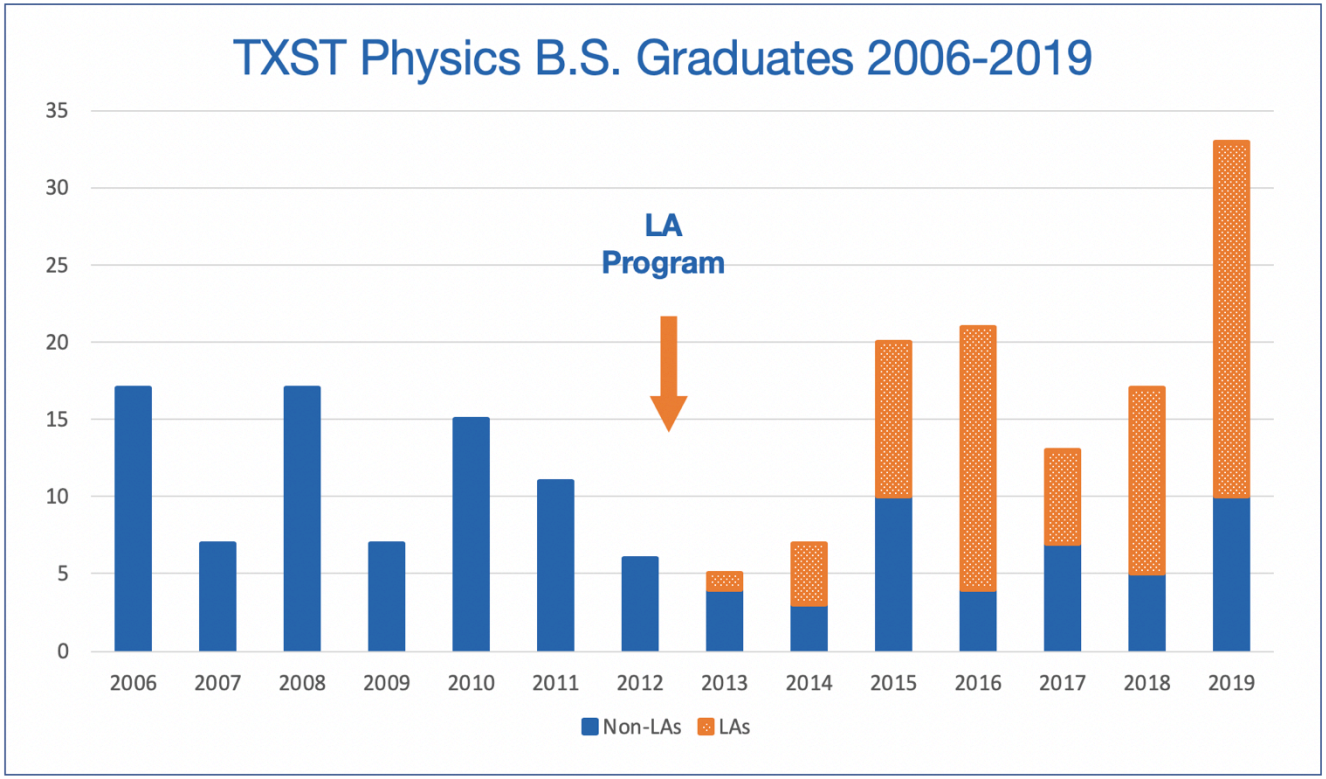
- Improved student learning outcomes (Pollock, 2009)
- Improved learning outcomes especially among students from traditionally underrepresented groups (Van Dusen & Nissen, 2020)
- Decreased failure in gateway courses (Alzen, Landgon, Otero, 2018)
- Persistence to graduation (Otero, 2015)
- Development of disciplinary Identities (Close, Conn, & Close, 2016)
- Academic and social integration among students (Top, 2019)
- Institutional change (Goertzen, Brewe, Kramer, Wells, & Jones, 2011)



Metropolitan State University of Denver

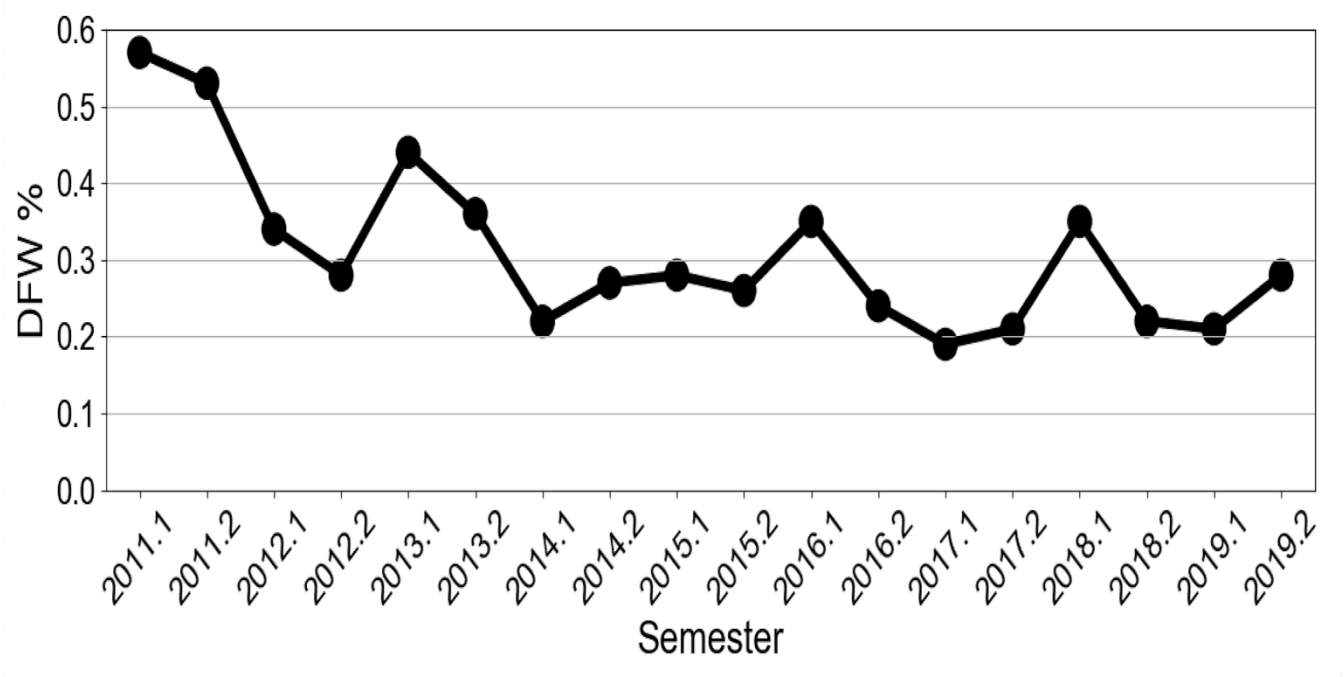
TEXAS STATE UNIVERSITY

The rising STAR *of Texas*



TEXAS STATE UNIVERSITY
The rising STAR *of Texas*

DFW rate for Physics 1430
(intro calculus-based mechanics), 2011-2019



TEXAS STATE UNIVERSITY

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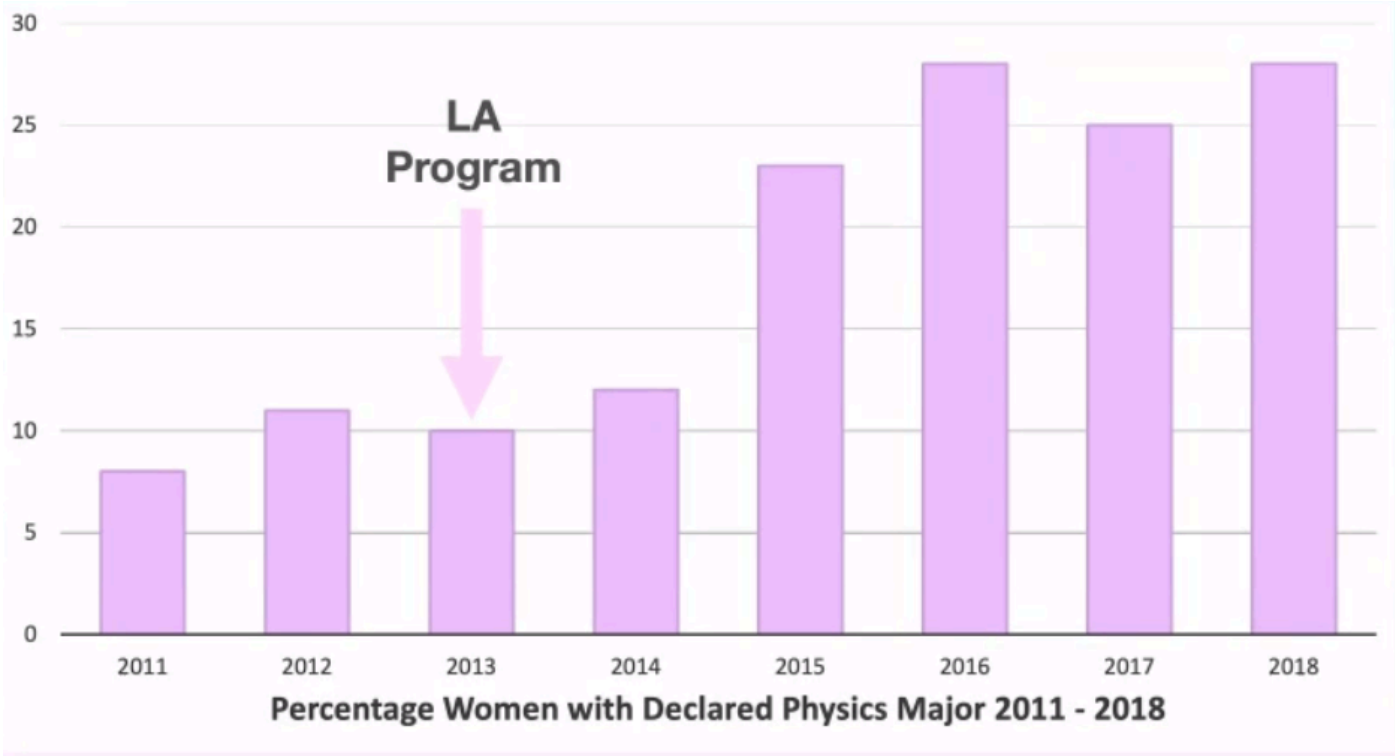
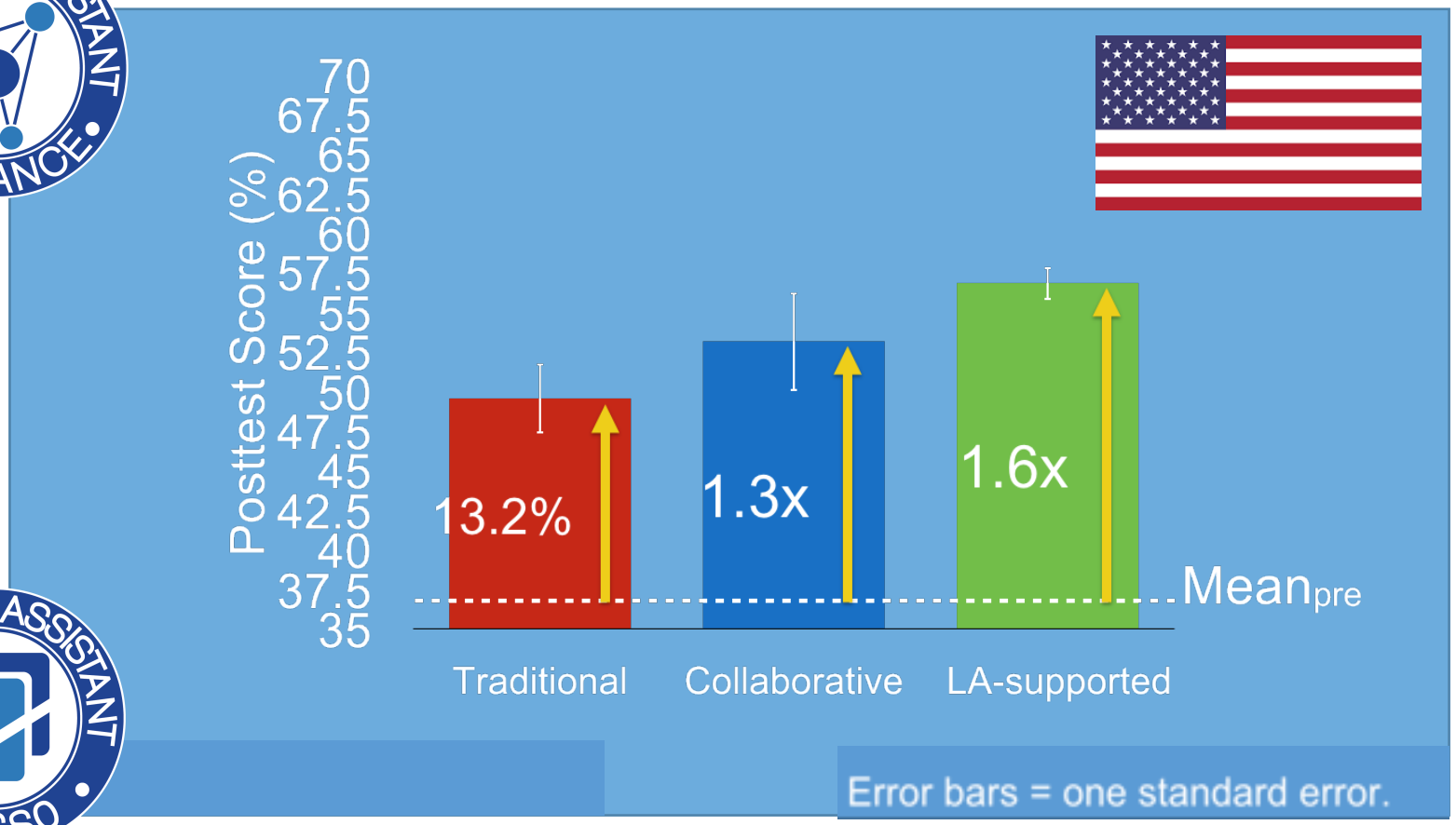
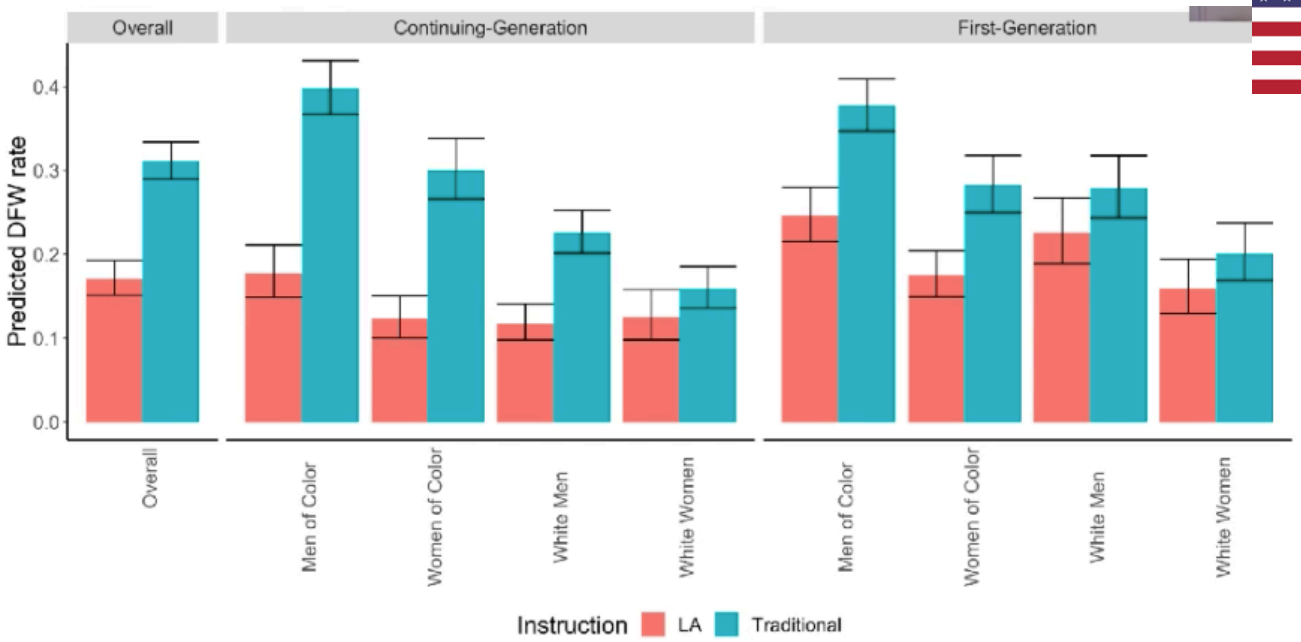


https://learningassistantalliance.org/

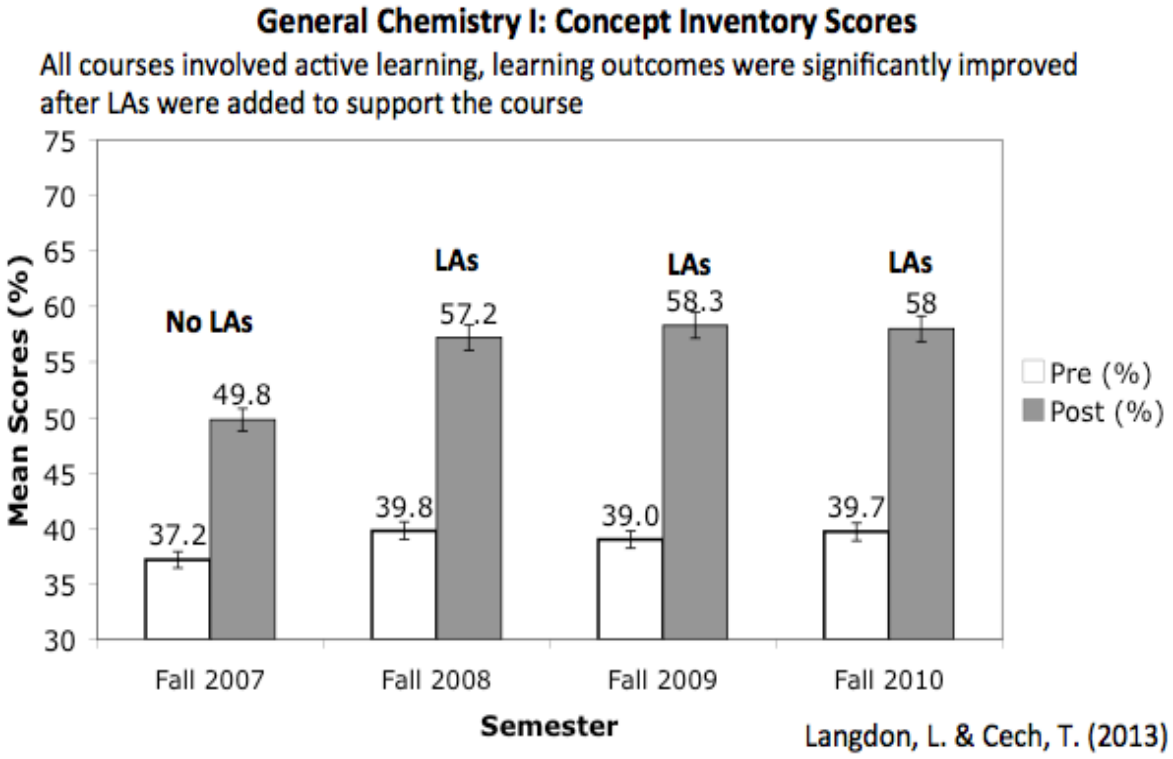


Learning About STEM Student Outcomes (LASSO) Herrera, Nissen, & Van Dusen (2018)



Van Dusen, B. & Nissen, J. (2020). Associations between learning assistants, passing introductory physics, and equity: A quantitative critical race theory investigation. *Phys. Rev. PER.*

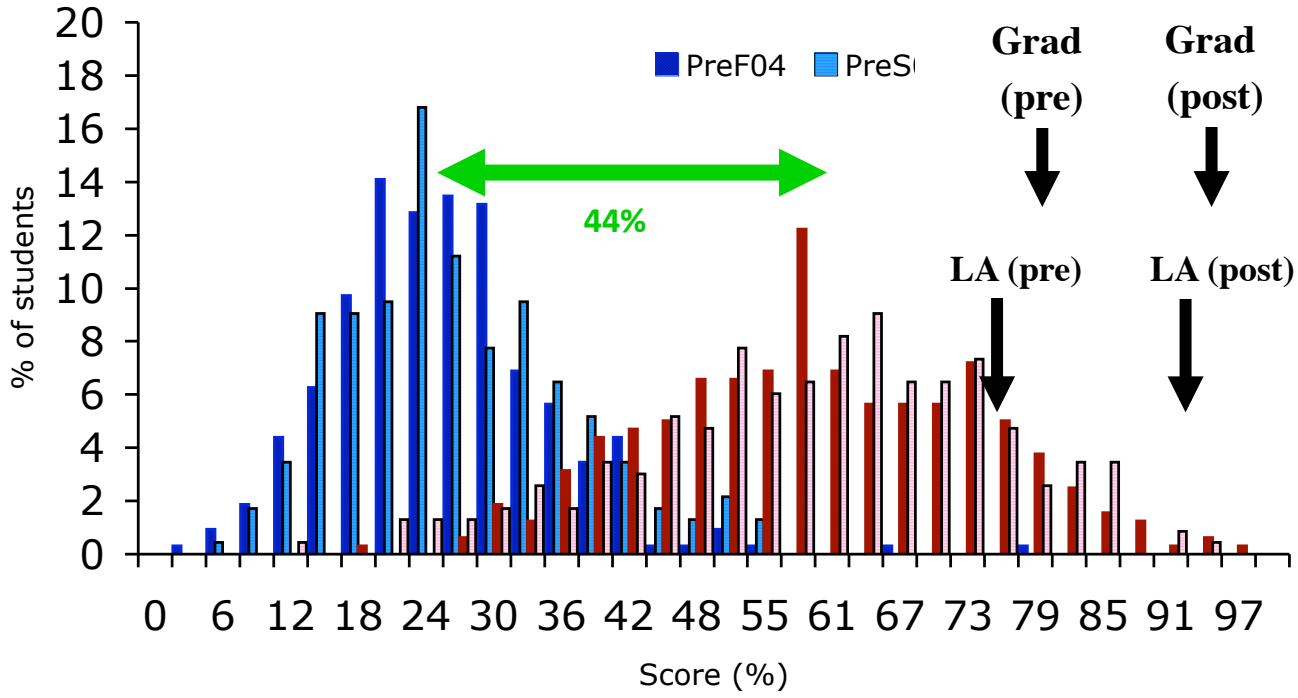
Student Learning in Chemistry



Langdon, L. & Cech, T. (2013)

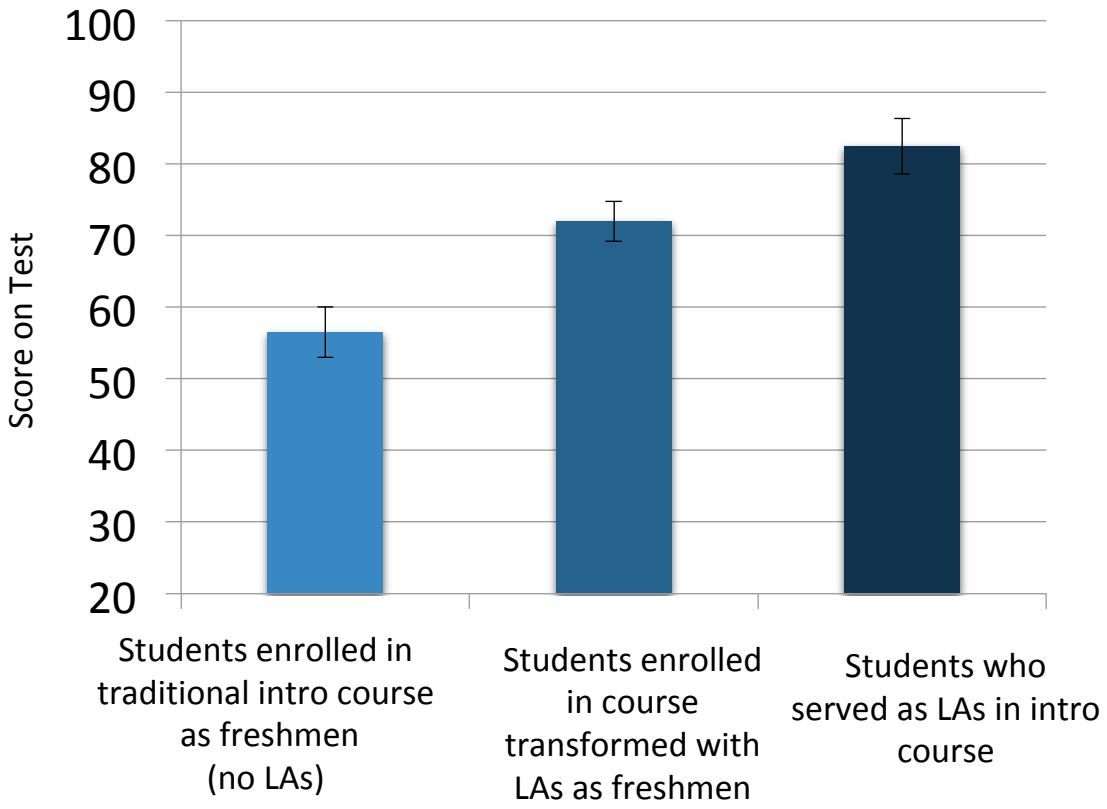
Student Learning in Physics

Score on Electricity and Magnetism Conceptual Test



Pollock, S. (2009). *PhysRev: ST Phys Ed. Rsrch* **5**, 020110, 1-8

Longitudinal Effects in Physics



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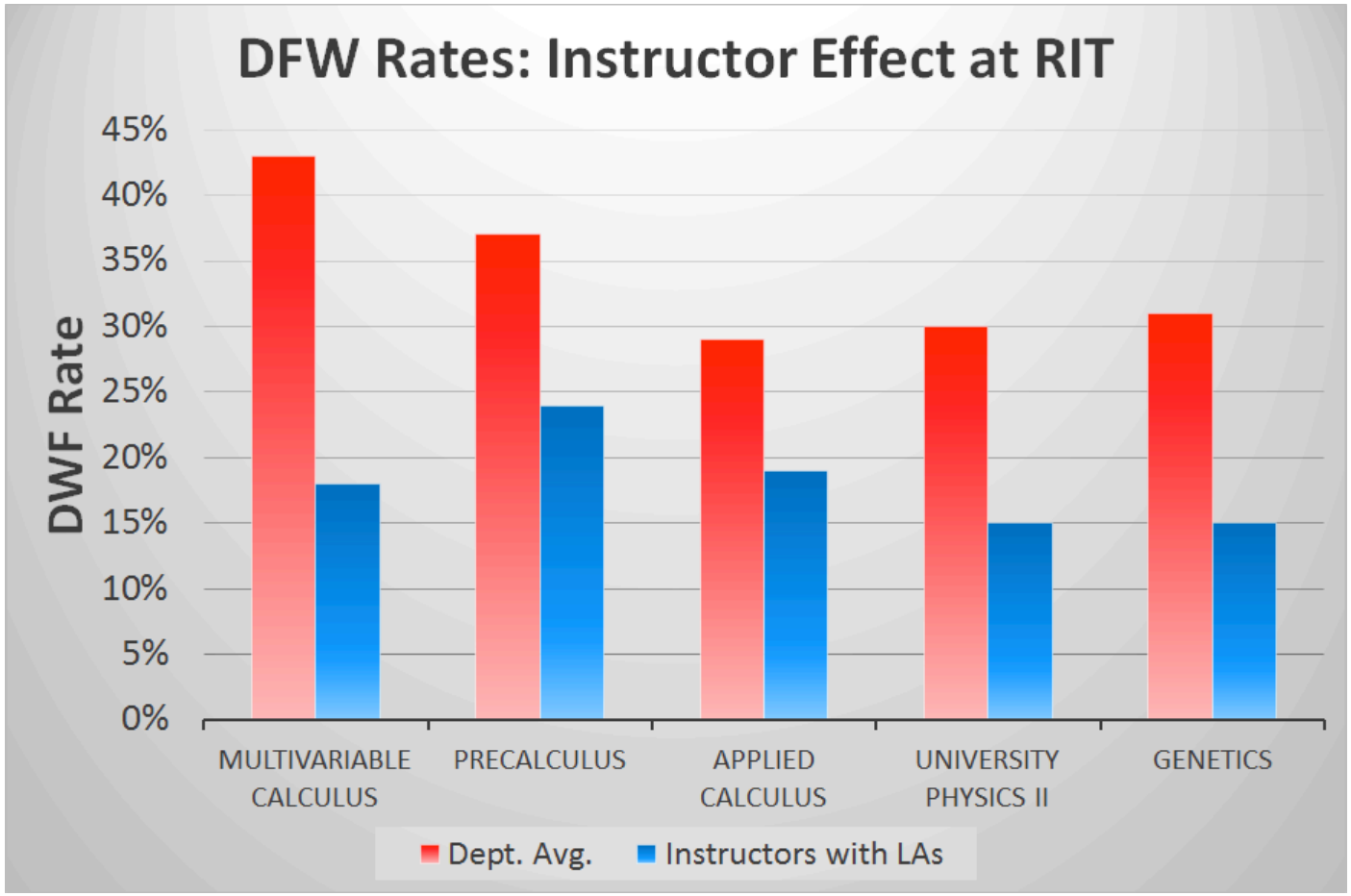
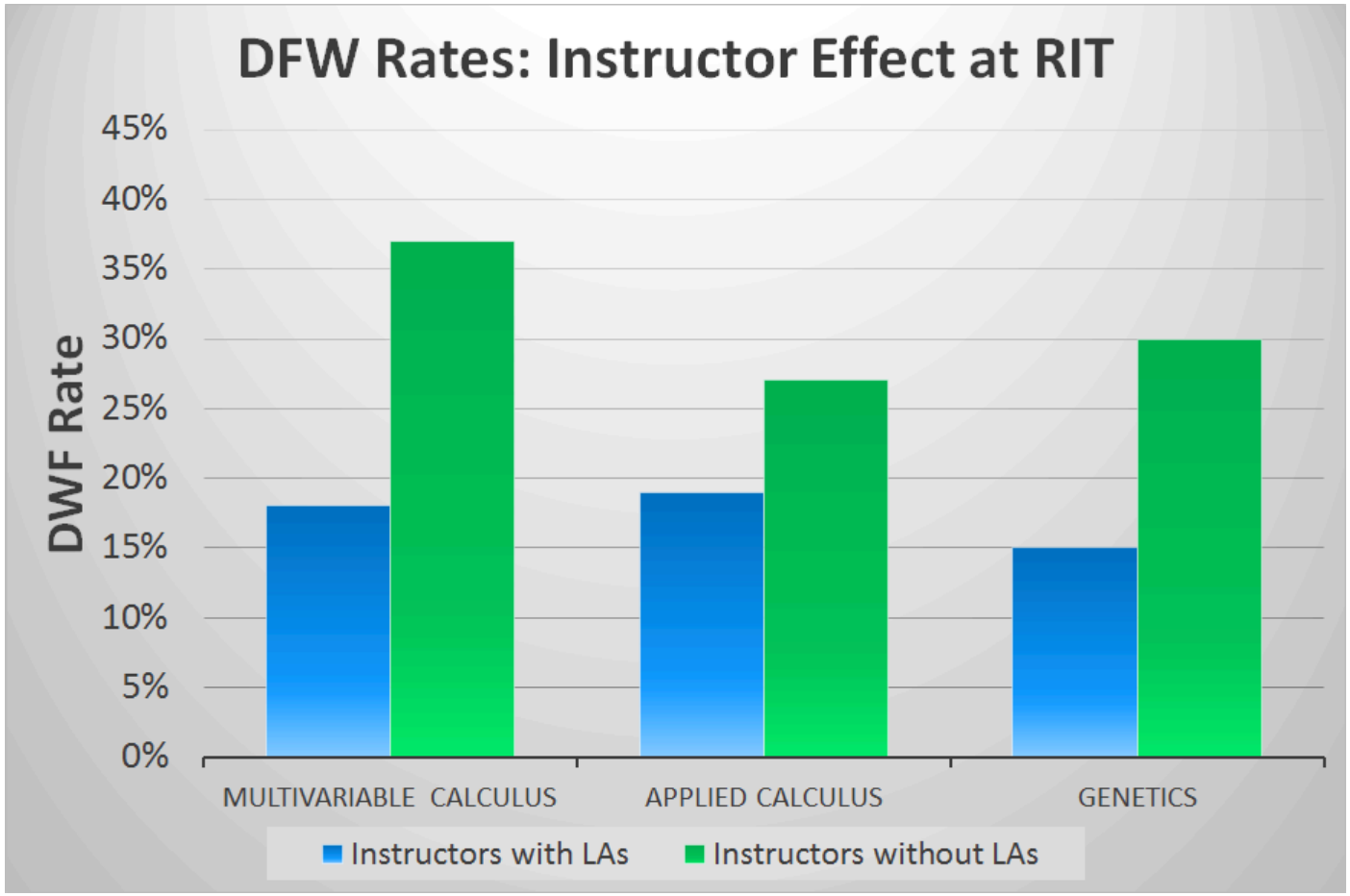


Franklin, S. (2018)



Franklin, S. (2018)

CU-Boulder Persistence to Degree:
Does *serving as an LA* make a difference?

Spring 2014 Study

LA Sample: 173 unique LAs that have

- Worked as an LA for at least one term since Fall 2003 – Spring 2014
- Started as an undergraduate by Spring 2008 (to allow time to graduate)
- Could be matched to at least one other non-LA undergraduate

Matched non-LA Sample: 9,215 unique undergraduates that have

- Not served as an LA
- Started as an undergraduate by Spring 2008
- Matched at least one LA (duplicate matches removed)

Criteria for matching:

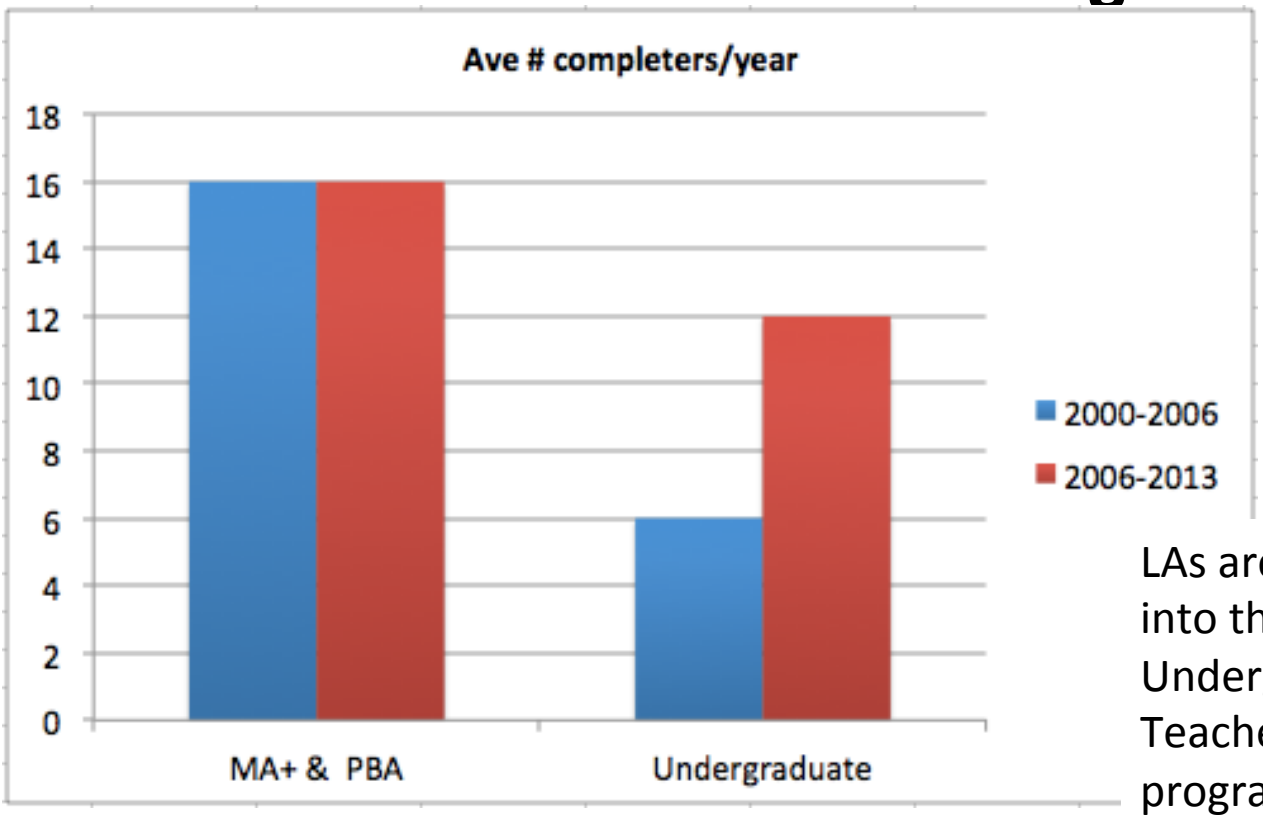
- ✓ Gender
- ✓ Predicted GPA +/- 0.1
- ✓ Class level during LA term
- ✓ College enrolled in as of LA term

Persistence to Degree (CU Boulder):
Does *serving as an LA* make a difference?

Enrollment Status as of Spring 2014	% LAs (n = 173)	% non-LAs (n = 9215)
Left CU-Boulder	2.9%	11.3%
Still enrolled (Spring 2014)	0.0%	0.5%
Graduated within 6 years	97.1%	88.3%
Grand Total	100.0%	100.0%

Otero (2015)

LAs are recruited to teaching

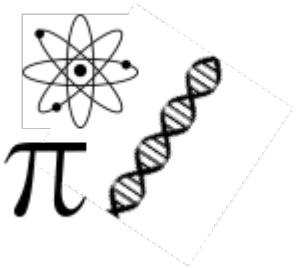
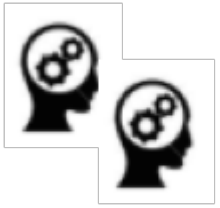


Approximately 13% of undergraduates who participate in LA program go on to enroll in a teacher certification program

LAs are recruited into the Undergraduate Teacher Certification program. Notice that the other program completion rate remained constant

Slice from one year at CU Boulder

Fall 2018-Spring 2019 Boulder Actuals

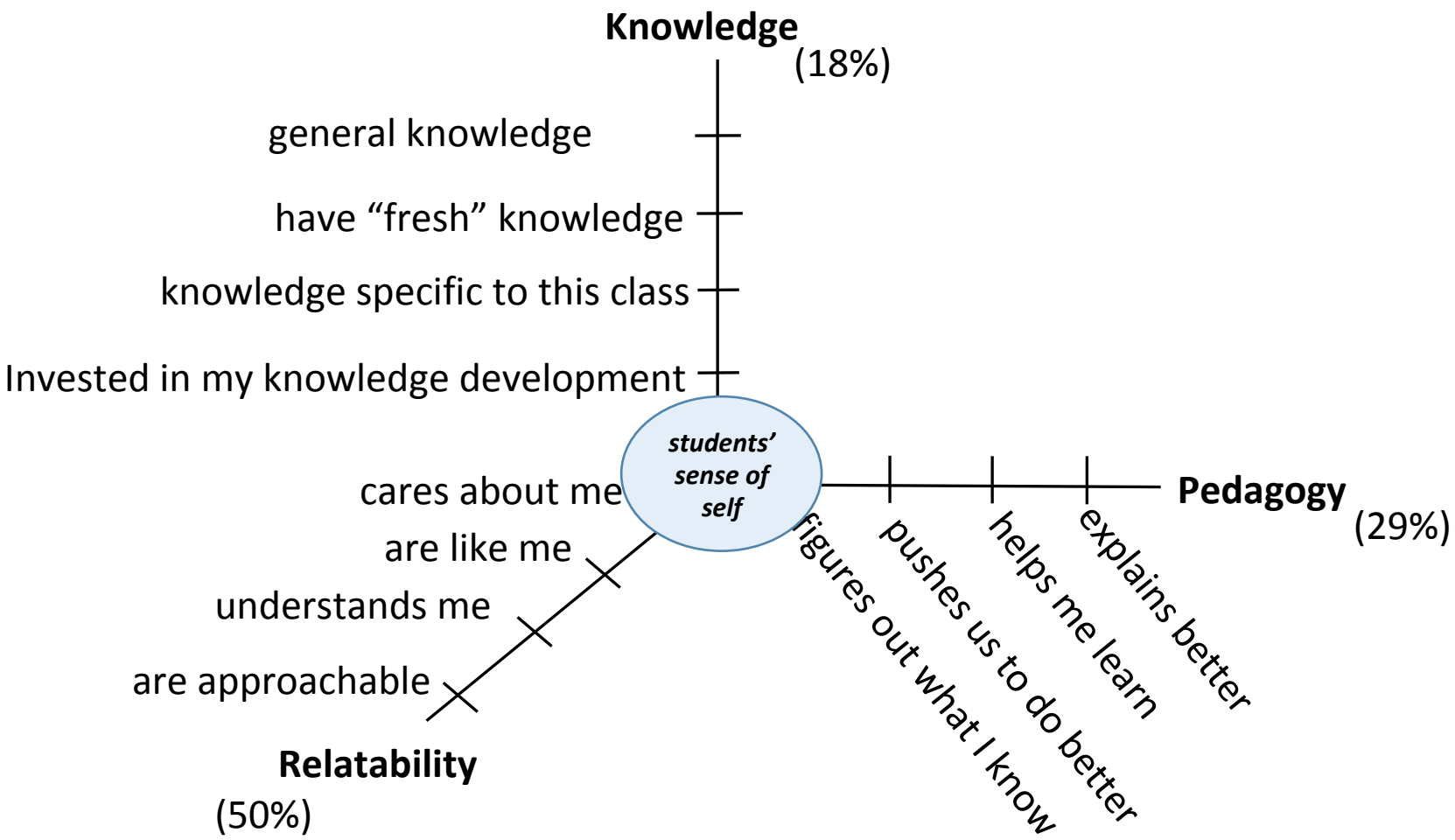
LAs Hired	LA-Supported Courses	Departments Participating	Colleges & Schools	Seats Impacted*
				
410	100	15	4	24,736

Program Cost: $50.00* per Impacted Seat

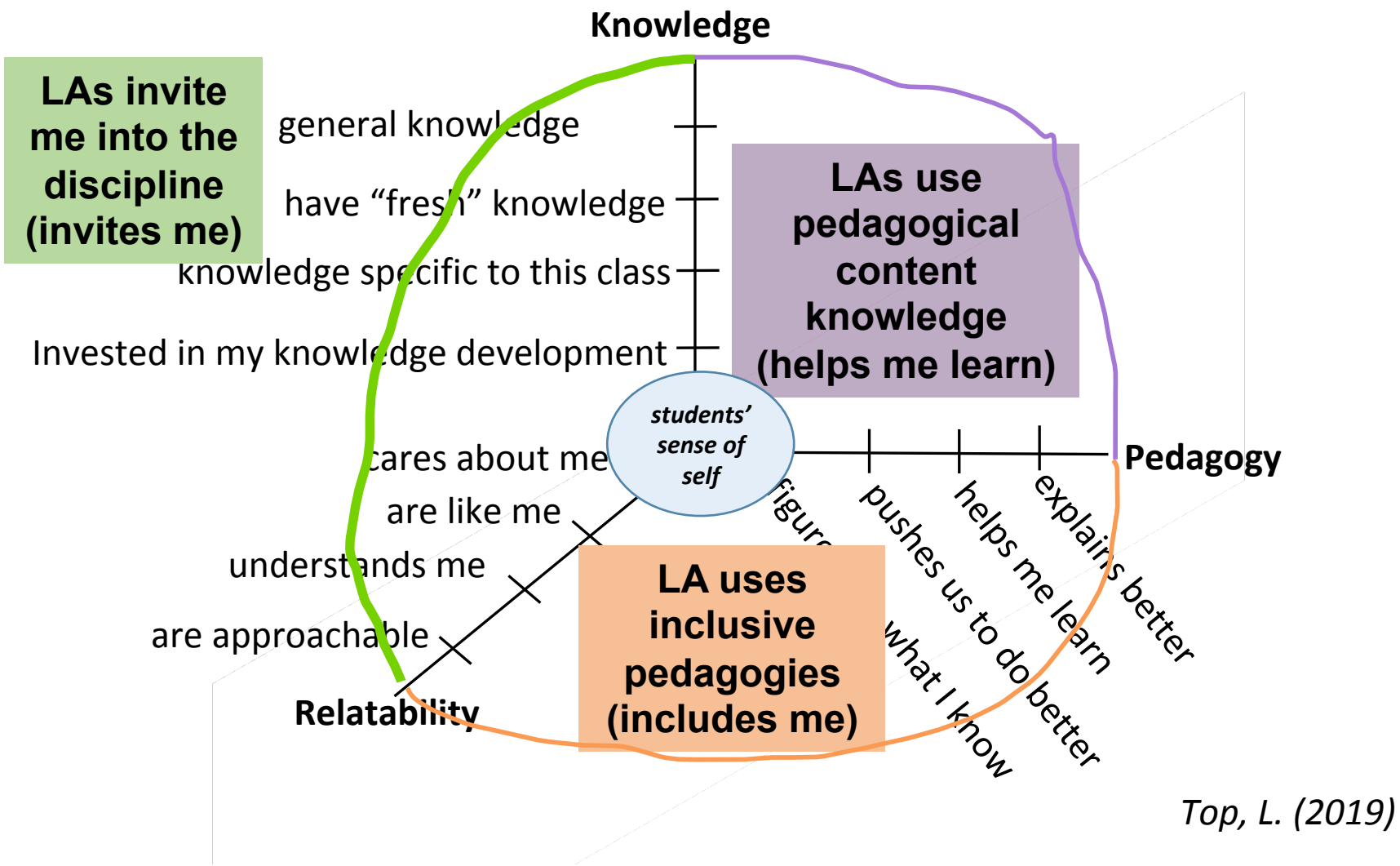
*reflects reported enrollments, some duplicated headcount

What makes the program effective?

What are LAs doing that could lead to these outcomes?


Knowledge
(18%)
general knowledge
have "fresh" knowledge
knowledge specific to this class
Invested in my knowledge development
students' sense of self
Pedagogy
(29%)
explains better
helps me learn
pushes us to do better
figures out what I know
cares about me
are like me
understands me
are approachable
Relatability
(50%)

Top, L. (2019)


Knowledge
general knowledge
have "fresh" knowledge
knowledge specific to this class
Invested in my knowledge development
LAs invite me into the discipline (invites me)
LAs use pedagogical content knowledge (helps me learn)
students' sense of self
cares about me
are like me
understands me
are approachable
Relatability
Pedagogy
explains better
helps me learn
pushes us to do better
what I know
LA uses inclusive pedagogies (includes me)

Top, L. (2019)

Knowledge

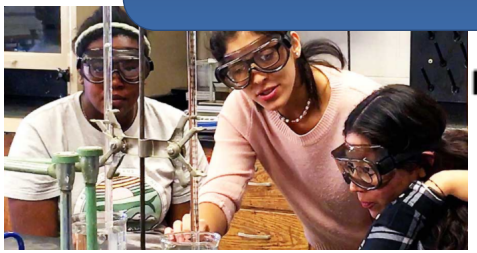
Instructional Team

students' sense of self

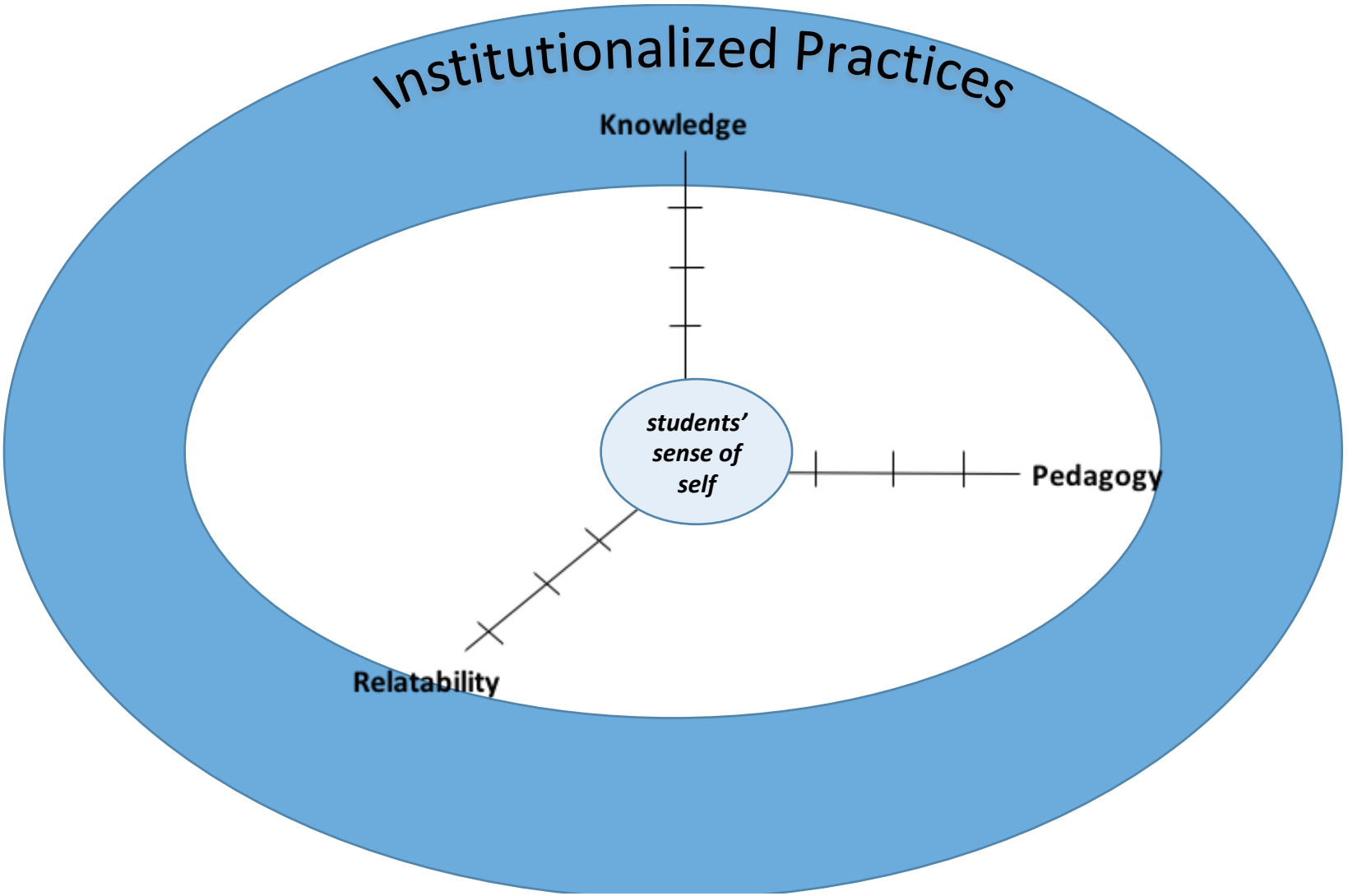
Pedagogy

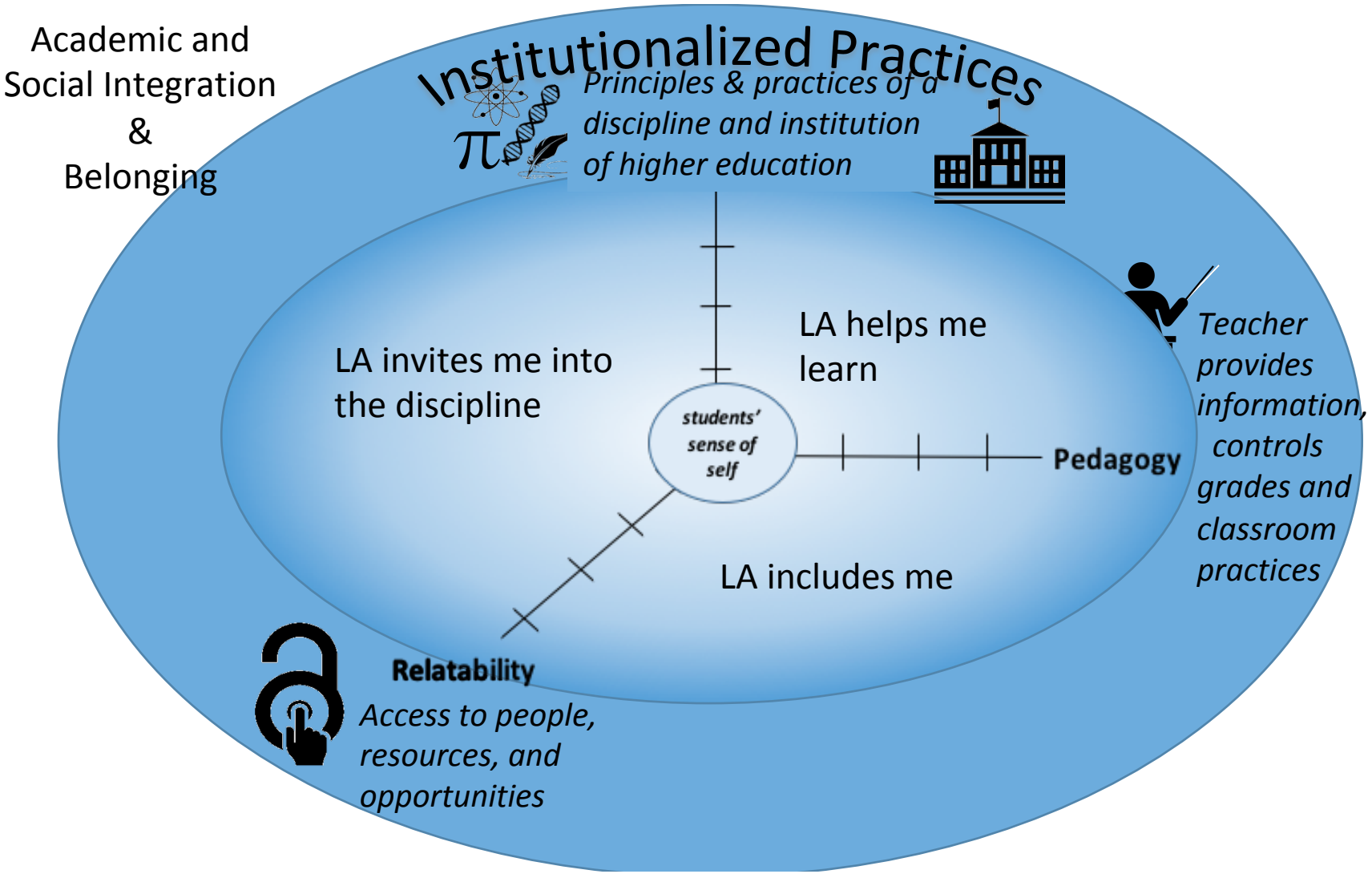
Advocates for education

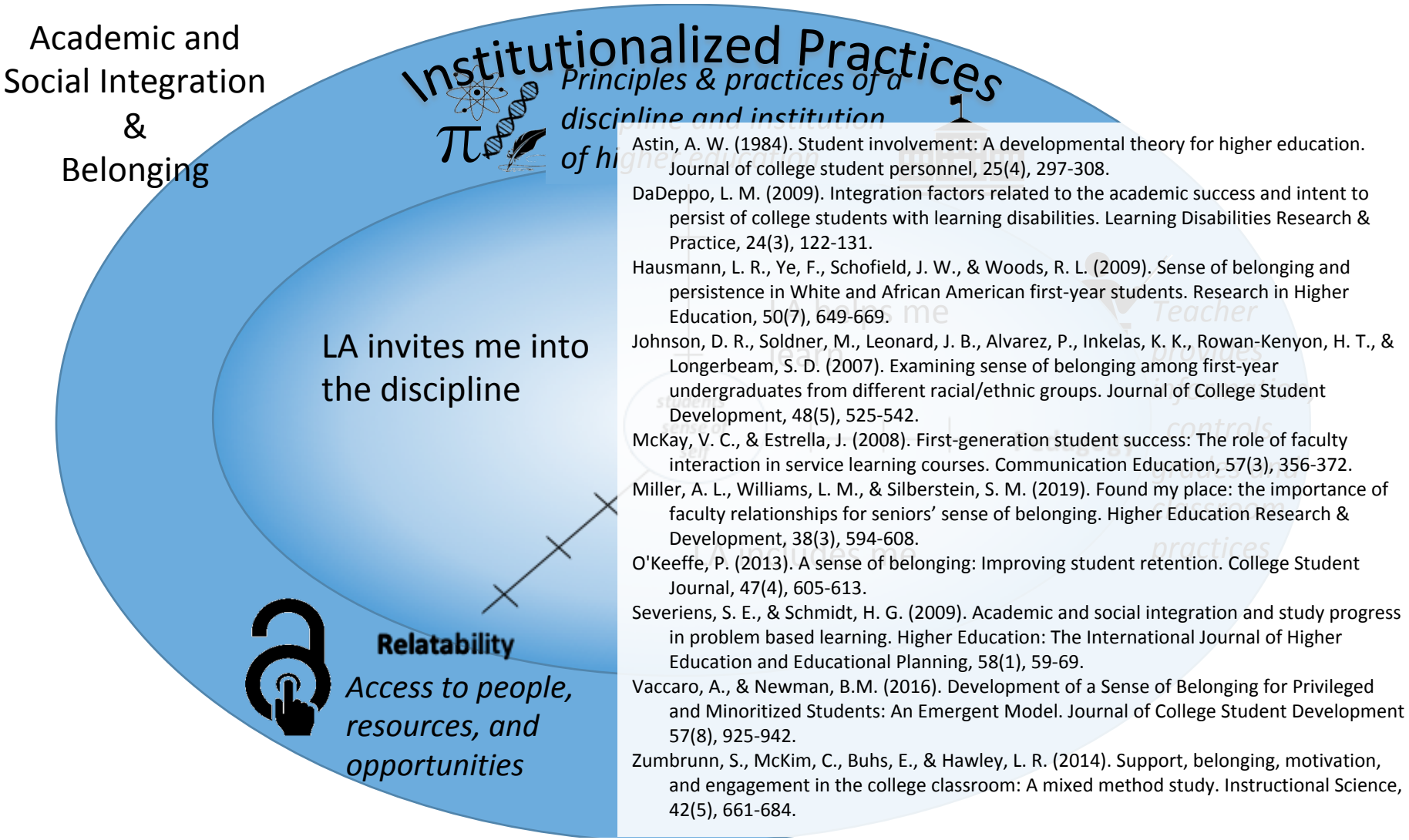
Are students



Relatability


Institutionalized Practices
Knowledge
students' sense of self
Pedagogy
Relatability


Academic and Social Integration & Belonging
Institutionalized Practices
Principles & practices of a discipline and institution of higher education
LA invites me into the discipline
LA helps me learn
students' sense of self
Pedagogy
Teacher provides information, controls grades and classroom practices
LA includes me
Relatability
Access to people, resources, and opportunities



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Johnson, D. R., Soldner, M., Leonard, J. B., Alvarez, P., Inkelas, K. K., Rowan-Kenyon, H. T., & Longerbeam, S. D. (2007). Examining sense of belonging among first-year undergraduates from different racial/ethnic groups. Journal of College Student Development, 48(5), 525-542.

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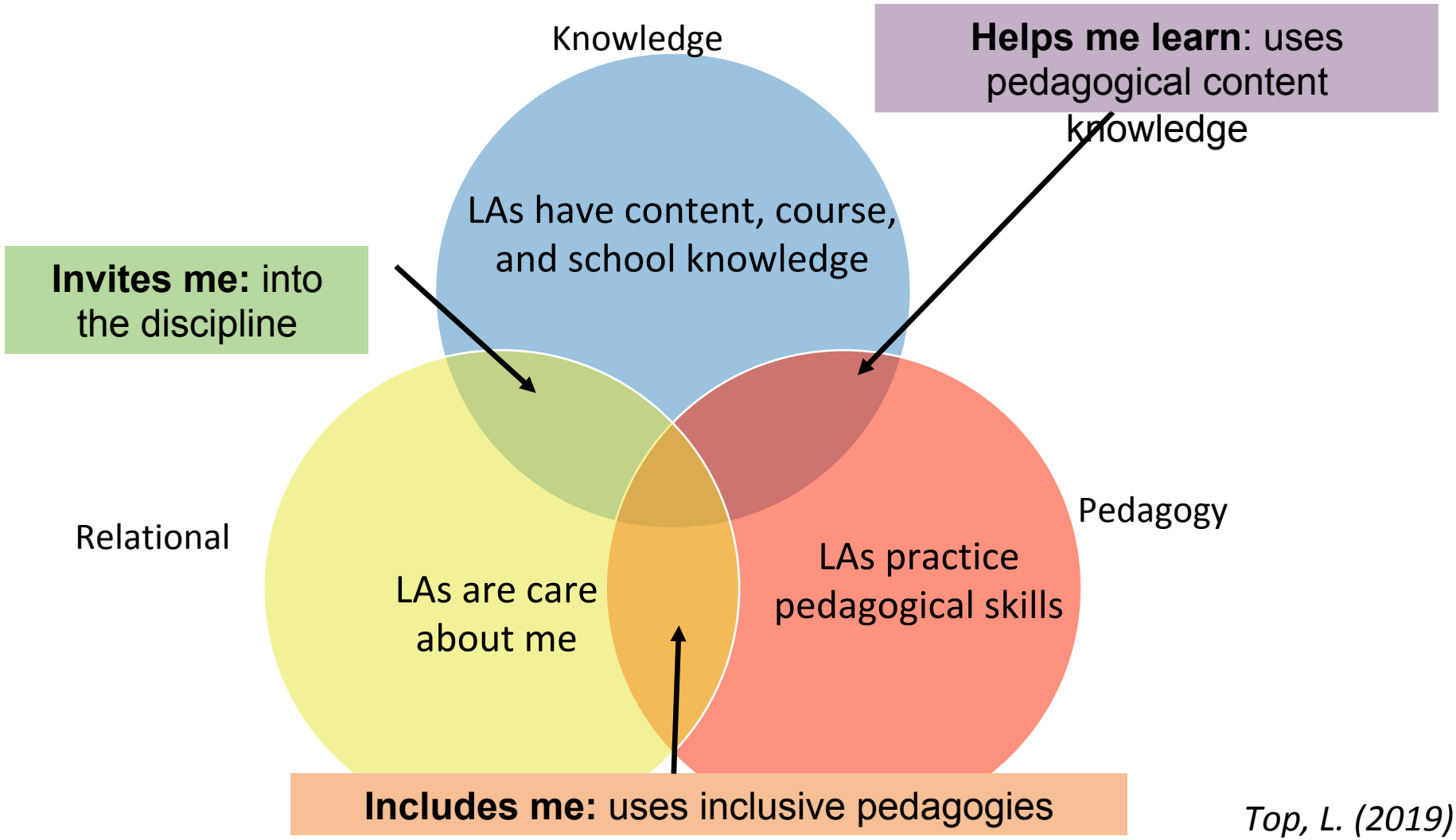
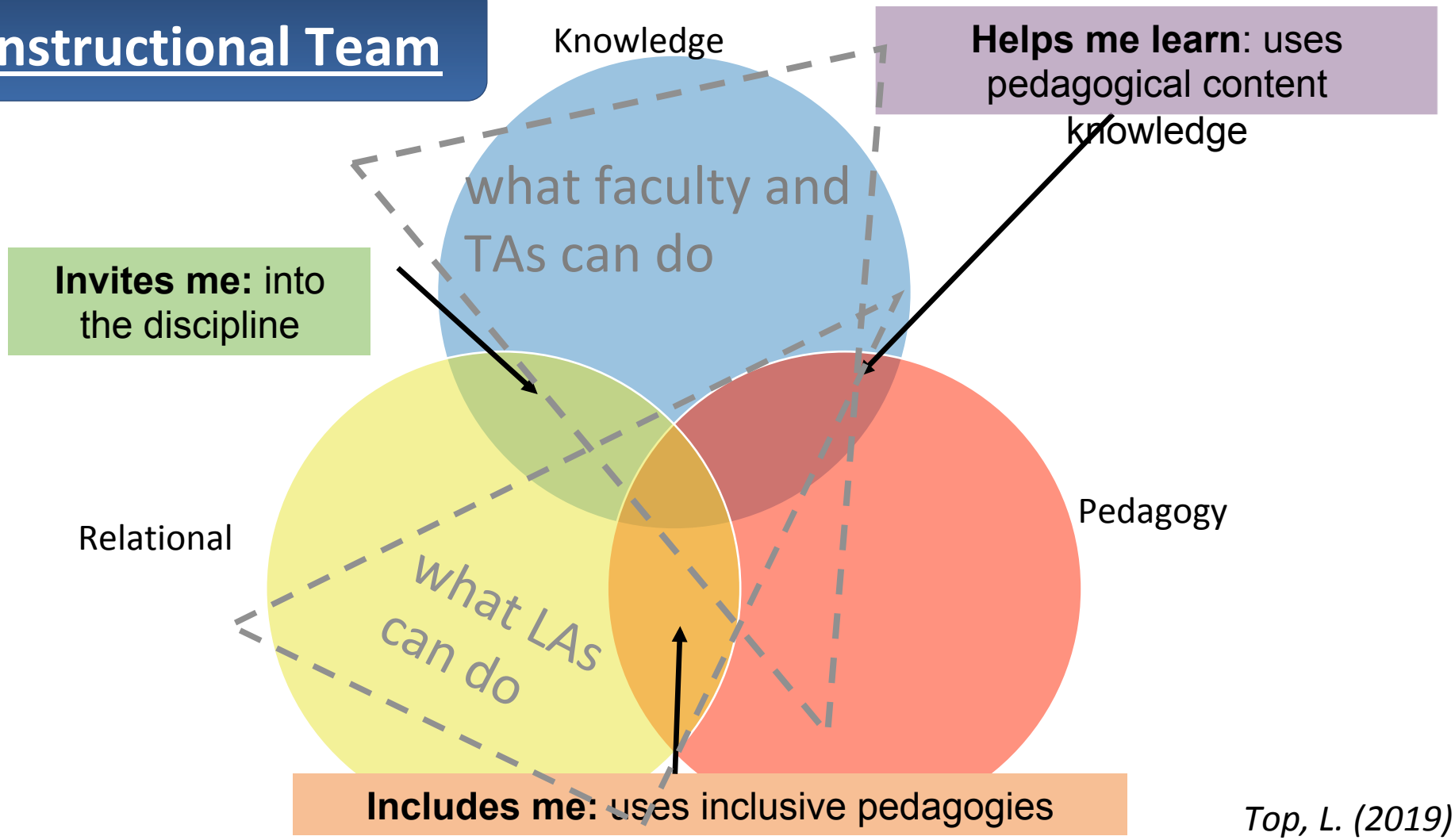

Knowledge
Helps me learn: uses pedagogical content knowledge
LAs have content, course, and school knowledge
Invites me: into the discipline
Relational
Pedagogy
LAs are care about me
LAs practice pedagogical skills
Includes me: uses inclusive pedagogies

Top, L. (2019)

Instructional Team



Top, L. (2019)

How LAs are used in classes:
https://www.youtube.com/watch?v=Av1IH8vSlZQ&feature=emb_logo

More details on LASSO study:
https://www.dropbox.com/s/jagyqyoq87ka6ye/Data%20slides.mp4?dl=0

https://learningassistantalliance.org/

Community/Conference

Assessment

Slides/Videos/Tools

Software

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