



Improving **U**ndergraduate **S**TEM **E**ducation **Initiative**



Peer-Led Team Learning (PLTL) – How Enlisting the Aid of Student Leaders Increases Student Success

Dr. Ana Fraiman

Dr. Kimshi Hickman

Dr. James Becvar




@IuseProgram



AAAS IUSE Initiative

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WORKSHOP



This presentation is being recorded. The recording and slides will be available in the coming week at <https://aaas-iuse.org>

Please note: The discussion break-out groups following the presentations will NOT be recorded.

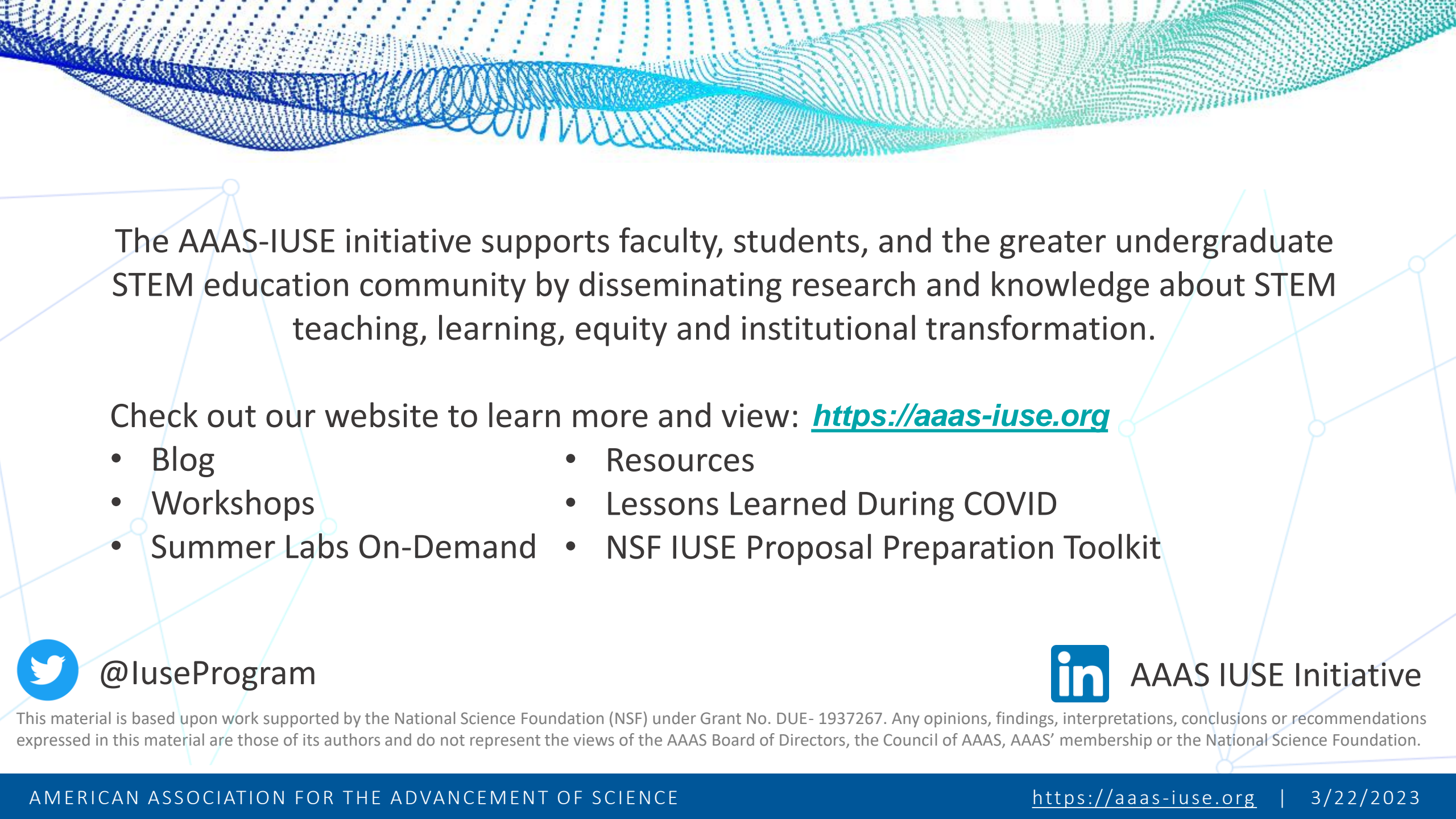
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The AAAS-IUSE initiative supports faculty, students, and the greater undergraduate STEM education community by disseminating research and knowledge about STEM teaching, learning, equity and institutional transformation.

Check out our website to learn more and view: <https://aaas-iuse.org>

- Blog
- Workshops
- Summer Labs On-Demand
- Resources
- Lessons Learned During COVID
- NSF IUSE Proposal Preparation Toolkit



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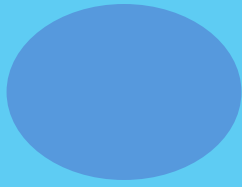
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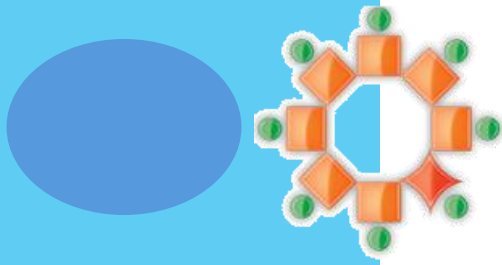
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WORKSHOP



Peer-Led Team Learning:
How Enlisting the Aid of Student Leaders
Increases Student Success
April 19, 2023 - 2:00-3:30pm EST
AACU-IUSE WORKSHOPS

- *Dr. Ana Fraiman, Emerita Professor of Chemistry,
Northeastern Illinois University*
- *Dr. Kimshi Hickman, Assistant Vice Provost for Retention and Completion,
The University of Texas at Arlington*
- *Dr. James Becvar, Distinguished Teaching Professor of Chemistry and
Biochemistry, University of Texas at El Paso*



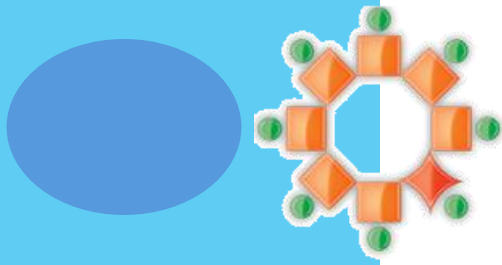
What is Peer-Led Team Learning?

Peer-Led Team Learning is a model of active engagement for learning, facilitated by an undergraduate Peer Leader who guides a group of learners in the process of solving problems.



- Provides an active learning experience for students
- Creates a leadership role for the Peer Leader



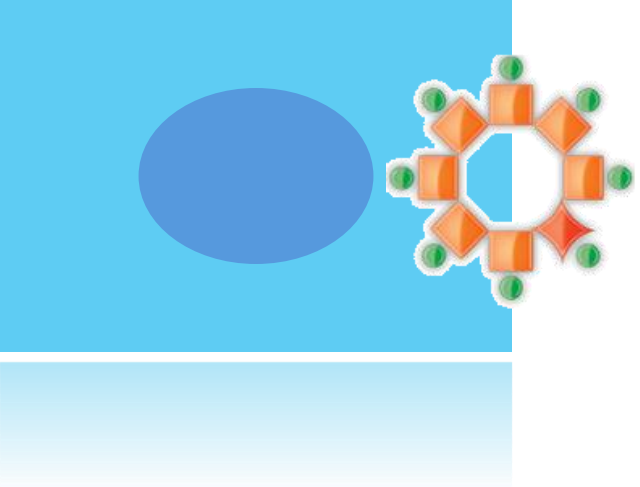


The Six Critical Components: Set of Benchmarks of the PLTL Model

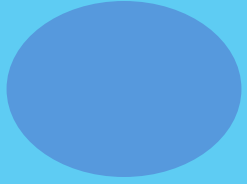
1. Peer-Led “Workshop” sessions are integral to the course
2. Instructors are closely involved
3. Peer leaders are prepared for their role and supported over time
4. The materials are challenging to promote discussion
5. Organizational arrangements are optimized
6. There is institutional support



We are currently preparing students for jobs and technologies that don't yet exist in order to solve problems that we don't even know are problems yet.

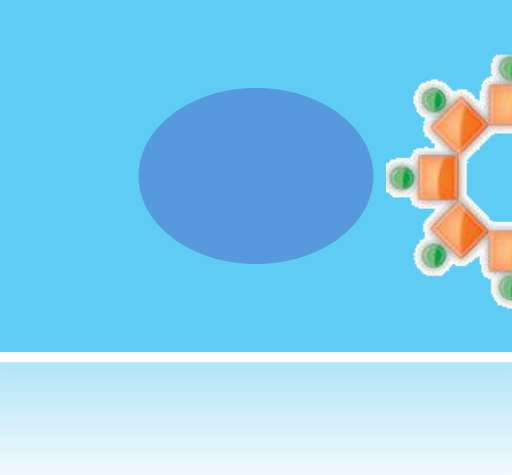


What are the challenges that you encounter with this new generation of students?



What are 21st Century skills that students need to acquire to be successful?

Medical professions, engineering professions, policy professions, and other professions



21st Century skills

Critical thinking

Communication skills

Creativity

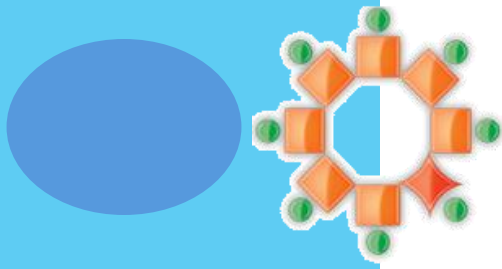
Problem-solving

Perseverance

Collaboration

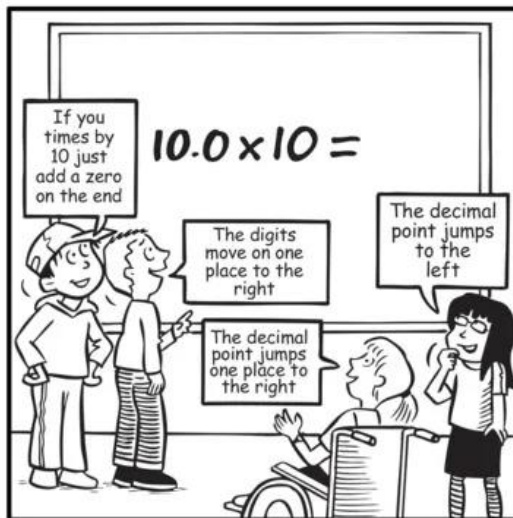
Information literacy

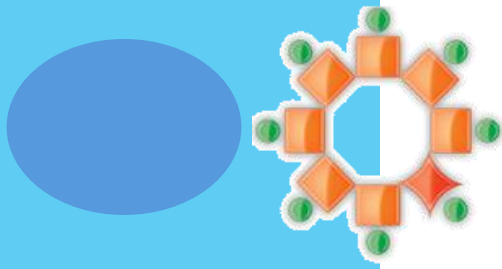
Technology skills and digital literacy



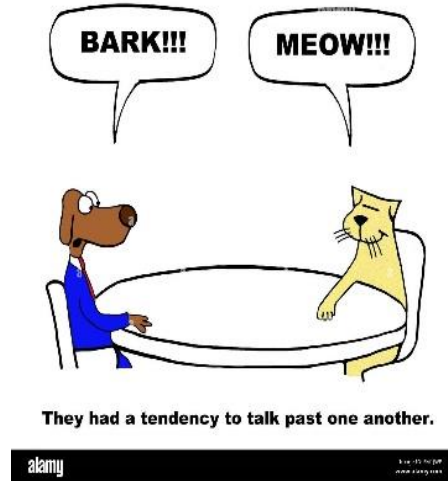
PLTL Provides Skills for the 21st Century

- **Communication and reflection**
 - Listening to others' opinion
 - Oral and written skills
- **Problem solving**
- **Critical thinking:**
 - Conceptualize and analyze a problem
 - Evaluate information from different sources through:
 - Reflection
 - Reasoning
 - Leading to a conclusion





PLTL Provides Skills for the 21st Century (2)



■ Collaboration and Teamwork

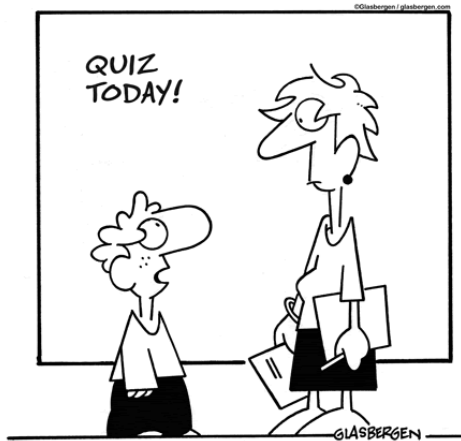
- Ability to work effectively and respectfully with diverse team members
- Development of cognitive flexibility
- Diversity of ways of thinking
- Understanding the value of individual contributions:
 - There is more than one way to solve a problem

■ Development of Leadership

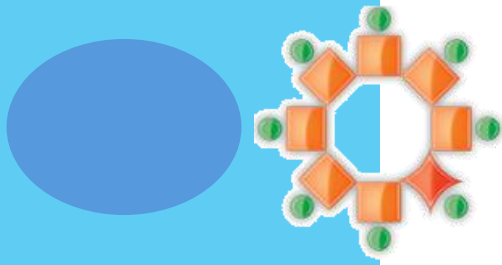
The Role of the Peer Leader

Helps learners to:

- Make connections to what they already know
- Understand that there is a process that is not about the final answer
- Consider answers only after a process of learning has occurred



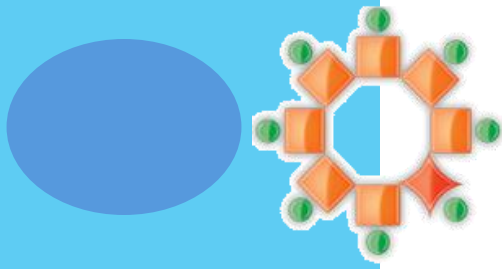
"I don't have a short attention span.
You have a long teaching span."



Supporting the Workshop Sessions: No Answer Key What? No Answer Key?

Workshop sessions are about:

- Learning how to construct answers
- How to evaluate different answers
- How to test for ambiguity
- How to test for completeness

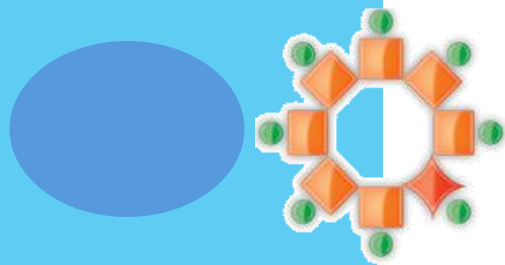


COMPONENT #5

Organizational arrangements are optimized

- Time and space are major concerns
 - ***Local conditions apply!***
 - Workshop sessions require a space conducive to small group discussion
 - Workshops must be scheduled in advance
- **Ideally**, a workshop is:
 - held for two hours (variability: 45 min. – 120)
 - held once a week with 6 - 8 students (variability: 4-24 students)
 - and attendance is required
- Online workshops have other requirements (e.g., technology)

Peer Leaders, at least their first time, should not have groups larger than a dozen students.



Optional Workshops - Northeastern Illinois University

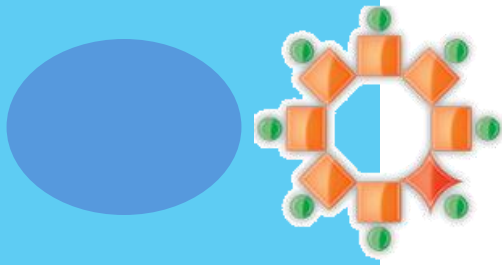
Organic Chemistry 1

- 40% of the students took the seminar (workshop) by choice
- 1% of those students withdrew from the seminar and the class simultaneously 1% of the remaining students failed
- The rest of the students completed Organic 1 successfully
- Overall, the attrition rate in the class decreased 50% from previous years.

Organic Chemistry 2

- 44% of the students took the seminar by choice
- 100% of the students who took the seminar in Organic 1 and were taking Organic 2 participated in the seminar.
- 100% of the students who completed the seminar completed Organic 2 successfully
- Overall, the attrition rate in the class decreased by 38%.

Also noteworthy: Peer Leaders improved 25% in the Organic Chemistry ACS standard test after participating in the program.



Discussion

- What are the challenges that you experience with the new generation of students?
- What are the advantages and challenges of PLTL over methods that you are already using in your institution to support students?

Peer-Led Team Learning (PLTL)

The Learning Center Model

The University of Texas at Arlington

- UTA is the largest university in North Texas and second largest in The University of Texas System. UTA is located in the heart of Dallas-Fort Worth and offers more than 180 baccalaureate, masters', and doctoral degree programs with more than 60,000 students engaged in campus or online coursework each year.
- UTA is a Carnegie Research 1 institution and a Texas Tier 1 institution.
- UTA is designated as an HSI and AANAPISI institution.
- UTA ranks No. 3 in the nation for ethnic diversity with a student body composition that is far above the national average.

Strategy for Sustaining PLTL

The Learning Center Model

- At UTA, PLTL is institutionalized through the Academic Success Center (ASC)
- PLTL Funding is provided through the ASC budget
- With the learning center model, you must have dedicated staff to run PLTL
 - Staffing at UT Arlington is the Director of the ASC, a full-time PLTL Coordinator
 - With PLTL expansion, I am funding another PLTL Coordinator role that will be posted within a week
- With the learning center model, the center recruits, hires, and trains the PLTL leaders
 - Leader requirements: 3.0 cum GPA, faculty recommendation, A or B in course
- The ASC oversees the registration process and secures locations for the PLTL sessions
- The ASC oversees data reporting for the program

Our Approach to Faculty Support

Faculty Liaisons

- **Engineering**
 - Faculty Coordinator - Dr. Lynn Peterson, Sr. Assoc. Dean
 - Faculty Liaison – Dr. David Ewing
- **Math**
 - Faculty Coordinator – Dr. Shanna Banda, Assoc. Professor of Instruction
 - Faculty Liaison Precalculus – Dr. Karl Backs
 - Faculty Liaison Calculus I – Dr. Mark Krasij
 - Faculty Liaison Calculus II – Dr. Ruth Gornet
- **Chemistry**
 - Faculty Coordinator – Dr. Greg Hale, Associate Dean
 - Faculty Liaison – Gen Chem I – Dr. Joshua Crowell
 - Faculty Liaison – Chem for Engineers – Dr. William Cleaver

Faculty Involvement

1. PLTL workshop must be coordinated with course faculty and is integral to the course
2. **Close involvement from course faculty** with the PLTL Leaders and the workshop
3. PLTL Leaders are students who have successfully completed the course are trained on teaching/learning strategies, and leadership skills for small groups
4. Workshop content is **challenging** at appropriate levels, and **integrated** within the course to encourage active learning
5. Organization of facilities, group size, noise level, and teaching resources are important factors to promote learning
6. **Logistical** and **financial** support will be provided by the institution at the **highest** levels of administration and pedagogy to encourage innovative teaching

Faculty Workbooks



PEER-LED TEAM LEARNING

International Society

pltlis.org

Our faculty were assisted greatly by The workbooks offered by the PLTLIS organization.

In addition to workbooks for faculty that have workshop problem examples, we also purchased training workbooks for our PLTL leaders.

PLTL Leaders

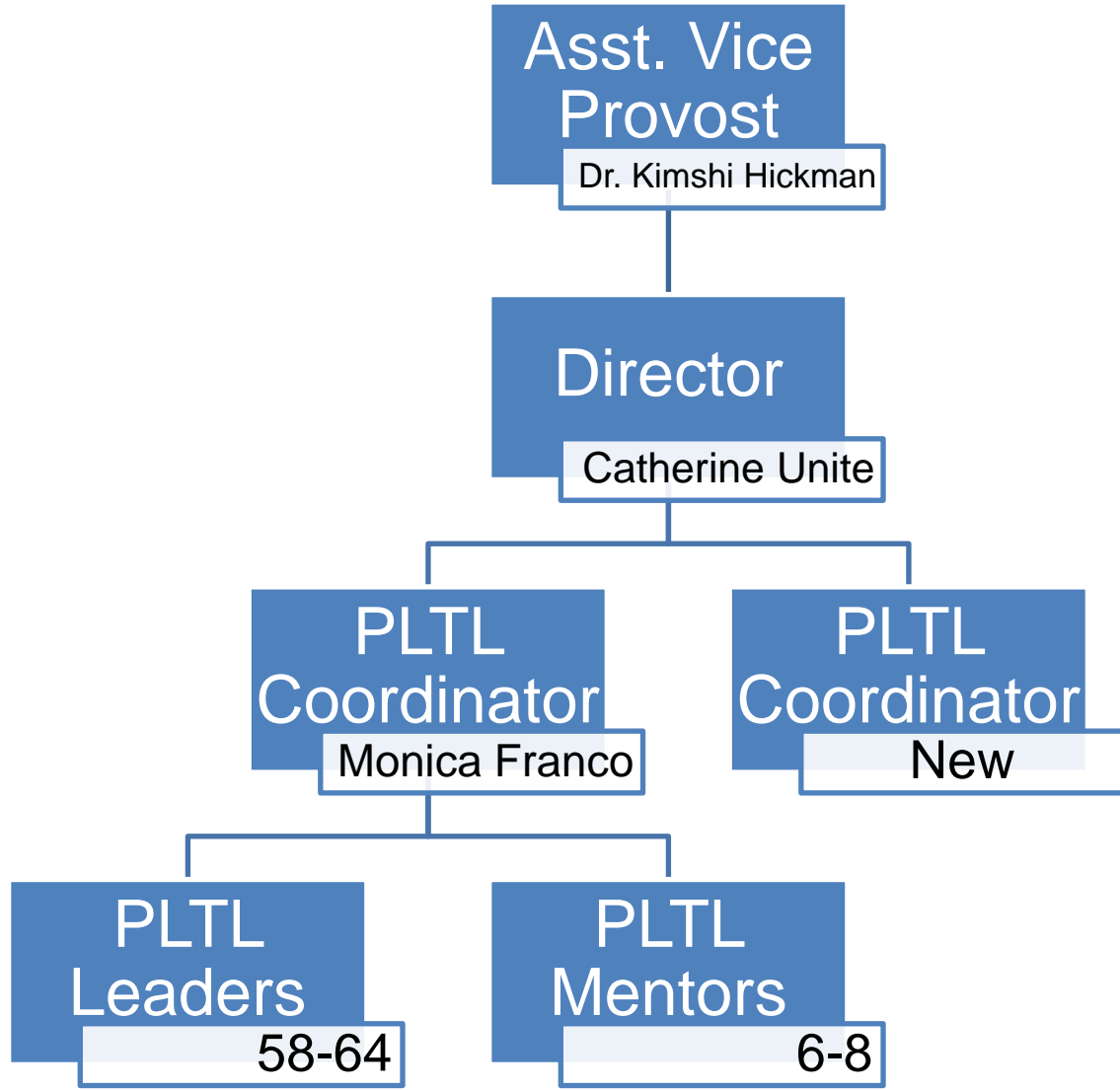
- Two student roles:
 - PLTL Leader
 - Qualifications: 3.0 cum GPA; A or B in course
 - PLTL Mentor
 - Qualifications: 2 semesters facilitating as a PLTL leader; strong participant and staff feedback
- Wages
 - Leader – \$13
 - Mentor – \$14

Integral to the course

PLTL implemented in 2 ways:

- **Embedded**
 - For the ENGR1251- Engineering Problem Solving, PLTL was embedded in the lab for the course
- **Sessions offered outside of class**
 - Offered M-Th between 9am-7pm & Fridays and Sundays 9am – 1pm

Academic Success Center PLTL Staffing



Facilities

Central Library

- 5 sessions can run concurrently

Dedicated Classroom

- 1 session at a time



Finances & Administrator Support

Designated Tuition Dollars

Funding covers:

- Salary for 2 Coordinator I positions
- Leader wages
- Mentor wages
- Materials/supplies
- Training
- Faculty travel stipend - \$3,000
- Staff and leader travel for PLTLIS conference

UTA PLTL Disciplines

- Engineering Problem Solving
- General Chemistry I
- Chemistry for Engineers
- Pre-calculus
- Calculus I
- Calculus II
- Calculus III
- General Chemistry II
- Differential Equations

PLTL Attendance & DFW Rates

	Fall 2022	Spring 2022	Fall 2021	Spring 2021	Fall 2020
ENGR 1251					
PLTL		N/A	N/A	1125	1755
MATH 1421					
PLTL	688	357	543	313	321
MATH 1426					
PLTL	1,080	393	601	637	n/a
MATH 2425					
PLTL	641	524	301	n/a	N/A
MATH 2326					
PLTL	395	N/A	N/A	N/A	N/A
CHEM 1441					
PLTL	838	443	935	n/a	n/a
CHEM 1442					
PLTL	523	N/A			
CHEM 1465					
PLTL	881	423	507	n/a	n/a
Total # of Sessions Attended	5,046	2140	2,887	2,075	2,076
Total Contact Hours	7,569	3,210	4,331	3,113	3,114

	Fall 2022	Spring 2022	Fall 2021	Spring 2021	Fall 2020
ENGR 1251					
PLTL	N/A	N/A	N/A	43.51%	34.63%
Non-PLTL	N/A	N/A	N/A	69.00%	30.00%
MATH 1421					
PLTL	51.58%	62.63%	51.06%	43.08%	30.30%
Non-PLTL	50.59%	33.83%	36.00%	45.00%	36.00%
MATH 1426					
PLTL	40.53%	45.45%	41.05%	35.97%	N/A
Non-PLTL	47.58%	54.13%	46.00%	49.00%	N/A
MATH 2425					
PLTL	16.85%	23.46%	38.46%	N/A	N/A
Non-PLTL	40.45%	31.16%	50.00%	N/A	N/A
MATH 2326					
PLTL	6.90%	N/A	N/A	N/A	N/A
Non-PLTL	20.35%	N/A	N/A	N/A	N/A
CHEM 1441					
PLTL	35.92%	33.82%	15.04%	N/A	N/A
Non-PLTL	57.89%	61.66%	56.00%	N/A	N/A
CHEM 1442					
PLTL	42.62%	N/A	N/A	N/A	N/A
Non-PLTL	46.28%	N/A	N/A	N/A	N/A
CHEM 1465					
PLTL	26.21%	31.63%	15.04%	N/A	N/A
Non-PLTL	37.05%	37.05%	56.00%	N/A	N/A

UTA PLTL Disciplines

Possible Future Courses:

Accounting

Linear Algebra

Anatomy & Physiology

Biology

Physics

Breakout Session

Capturing the Creativity and Entrepreneurial Value of Undergraduate Students Trained to Facilitate Learning

Dr. James E. Becvar

The University of Texas at El Paso



LEAD FOR AMERICA CORPORATION

Explosive Creativity

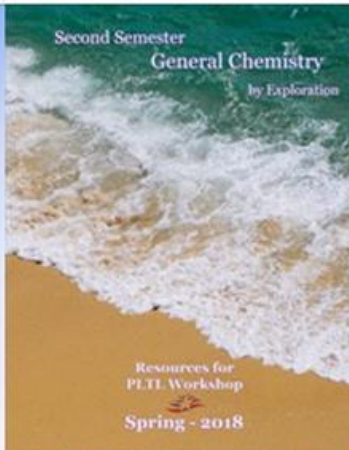
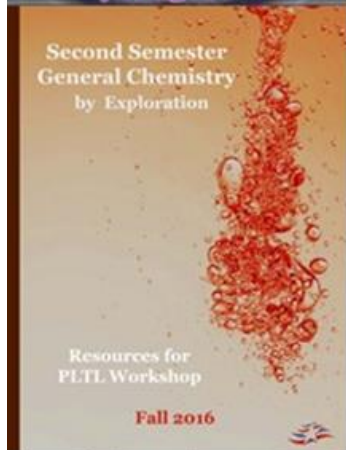
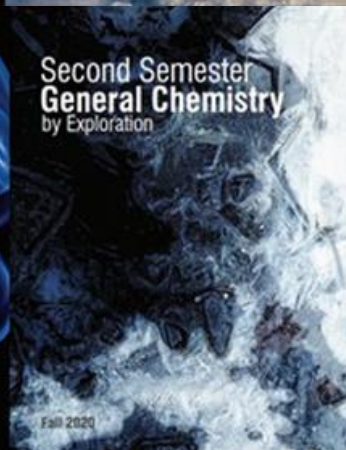
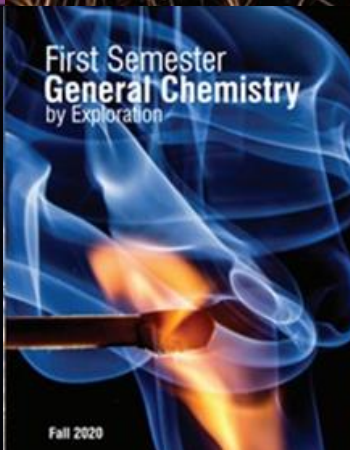
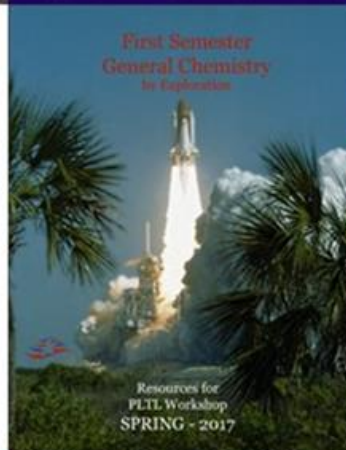
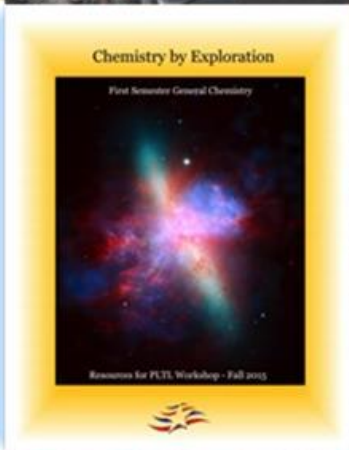
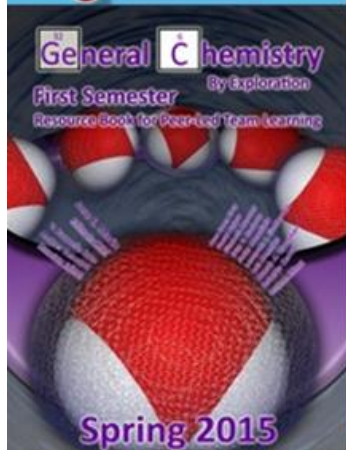
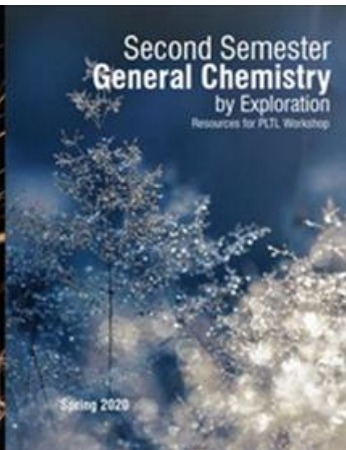
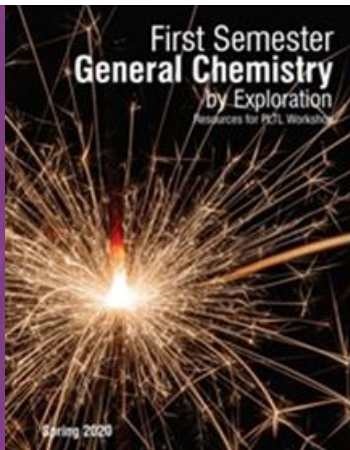
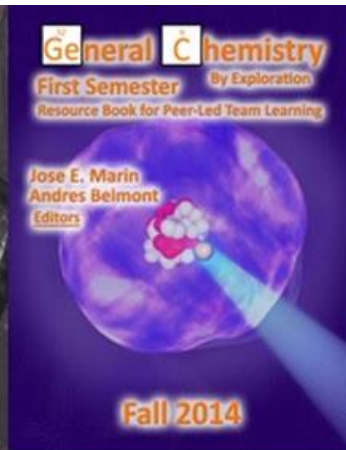
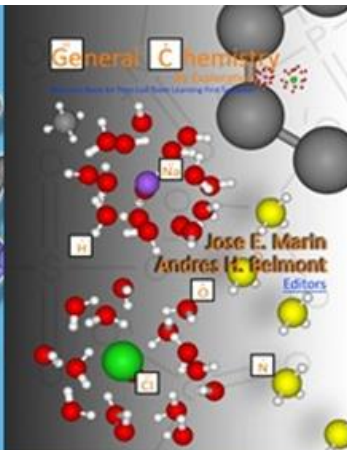
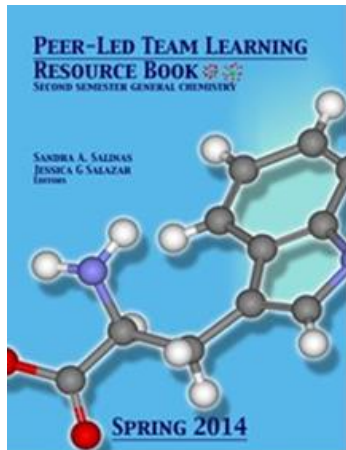
- Creativity Catches Fire
- Hands-On Explorations Spur Student Interest
- Chemistry Circus Wows Kids



- Explorations and community outreach are organized by Peer Leaders to encourage student engagement

Creating Leaders



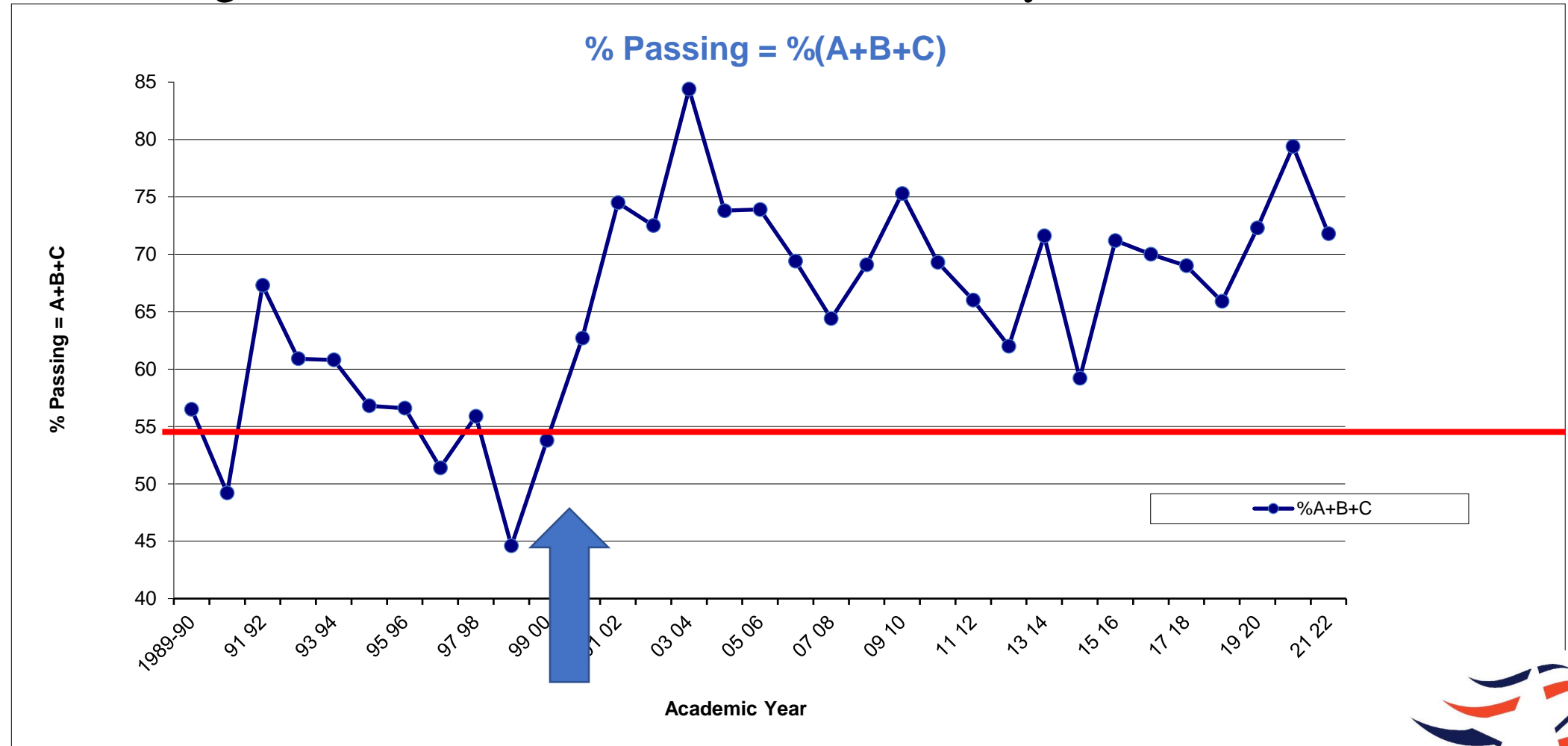


Selected Peer Leader Products



The 23 Year Story

Passing Rate in First Semester General Chemistry at UTEP 1988 – 2022



Funding a PLTL Program

Lead For America Corporation Donations to Education 2012-2023

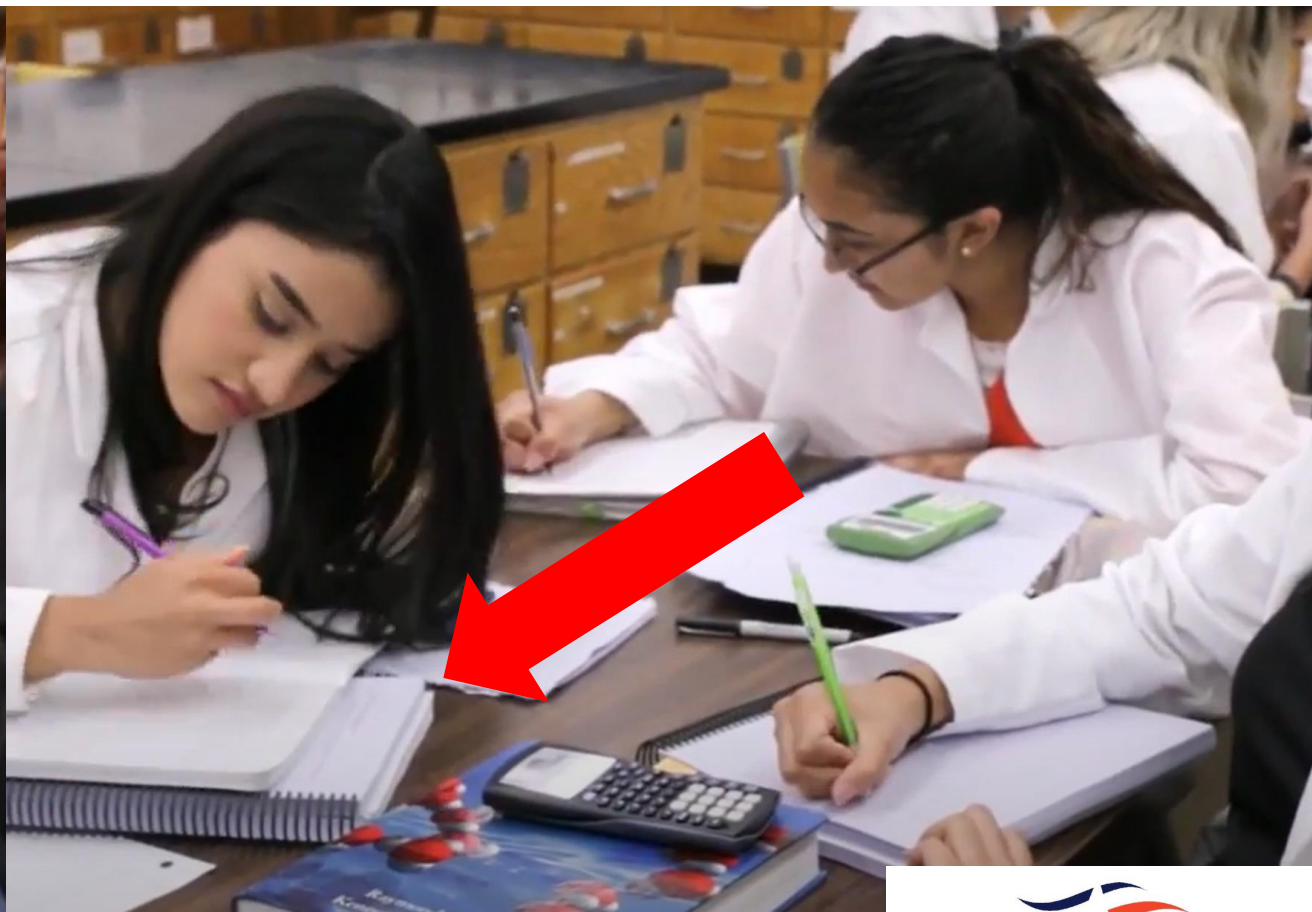


LFAC funding provides:

1. Student salaries
2. Pre-semester and in-semester training costs
3. Travel Grants for Professional Development



The Workbook in Action



Chemistry PLTL (University of Texas at El Paso)



Implementing PLTL

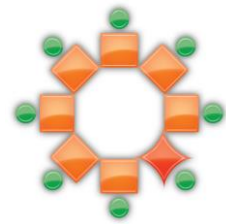
1. Start student-facilitated learning intervention
2. Organize a small set of creative Leaders
3. Have Leaders write **Materials** – on their **own, unpaid time**
4. Start a 501c(3) **non-profit**
5. Assemble materials into a **minimum viable product (MVP)**
6. Sell MVP and donate royalties to **university gift fund**
7. Make intervention become **self-sustainable**
8. **Use LFAC, PLTLIS, APLL to help you!**
9. Contact jbecvar@utep.edu



Implementing PLTL



jbecvar@utep.edu

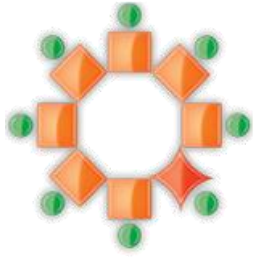


PEER-LED TEAM LEARNING
INTERNATIONAL SOCIETY



Advances in Peer-Led Learning

Peer-Led Team Learning International Society



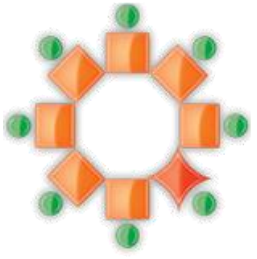
Peer-Led Team Learning International Society

- Supports the development of Peer-Led Team Learning
- Provides Resources, a growing Network, and Advocacy
- The **vision** is that Peer-Led Team Learning is integral to excellent educational practice.
- The **mission** is to foster student learning through peer-led teams by supporting practitioners and institutions.
- The Peer-Led Team Learning International Society has a 501(c)(3) designation as a not-for-profit corporation.



Next Steps: Support through the Peer-Led Team Learning International Society

- Submit papers to PLTLIS Journal, *Advances in Peer-Led Learning (APLL)* - Next issue: Fall 2023
- Prepares Peer Leaders through a series of webinars focused on facilitation and leadership
 - PLTLIS workbooks on facilitation
- Prepares Peer Leaders for specific disciplines using existing workbooks
- Helps develop materials in specific disciplines and interdisciplinary areas
- Creates PLTL communities in the United States and across countries



For more information:
www.pltlis.org

- **Jim Becvar**, University of Texas at El Paso, jbecvar@utep.edu
- **Ana Fraiman**, Northeastern Illinois University, afraiman@neiu.edu
- **Kimshi Hickman**, University of Texas at Arlington, kimshi.hickman@uta.edu

Contact: info@ptlis.org

See www.pltlis.org/Resources/Workshop-materials
for *Short Guide to the Practice of Peer-Led Team Learning*



Peer-Led Team Learning International Society

11th Annual Conference

Hosted by University of Houston Downtown

Location: Houston, Texas, USA

May 31-June 3, 2023

www.pltlis.org

Join PLTL Practitioners and Peer Leaders!



Thank you for attending!

Slides and recording will be available in the coming days.

We value your feedback, please take a few minutes to complete the survey.



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<https://www.aaas-iuse.org>



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