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Achieving Student Success Using Peer-Led Team Learning (PLTL)

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Abstract

This paper presents the results of a five year implementation of peer-led team learning at the University of Texas at El Paso (UTEP) in five freshmen and sophomore chemistry, physics, and mathematics courses. The intervention was designed to improve retention and success of these students in their undergraduate program. The imperative for this work, to fulfill the University of Texas at El Paso's mission of "access and excellence," provided a new option to the traditional large-lecture course of yesteryear. Students indicated they learned more in their small group workshops than by any other modality offered.

Introduction

The Peer-Led Team Learning (PLTL) (Gosser and Roth, 1998; Gosser, et al. 2001; Cracolice and Deming, 2001) workshop model engages teams of students in peer-assisted learning (Fuchs, et al, 1997) of the sciences, mathematics, and other undergraduate disciplines guided by an undergraduate peer leader. It provides an active learning experience with a leadership role for undergraduate students, and engages faculty in a creative new dimension of instruction. At UTEP, faculty members relinquish one hour of large class lecture in exchange for a two-hour, small group (12-16) peer-led workshop (Becvar, 2004; Becvar, et al, 2008).

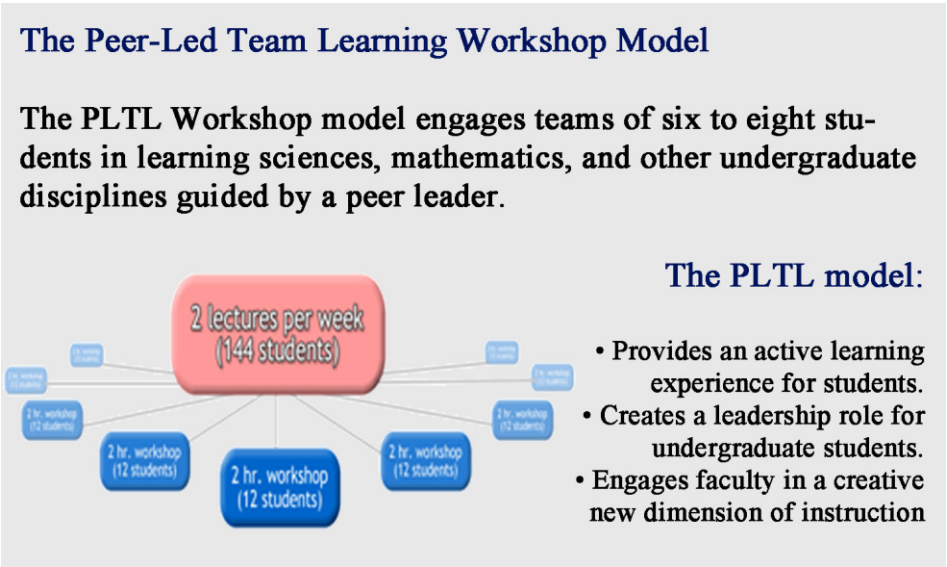


Figure 1: The 'Plus Two' Peer-Led Team Learning Workshop Model

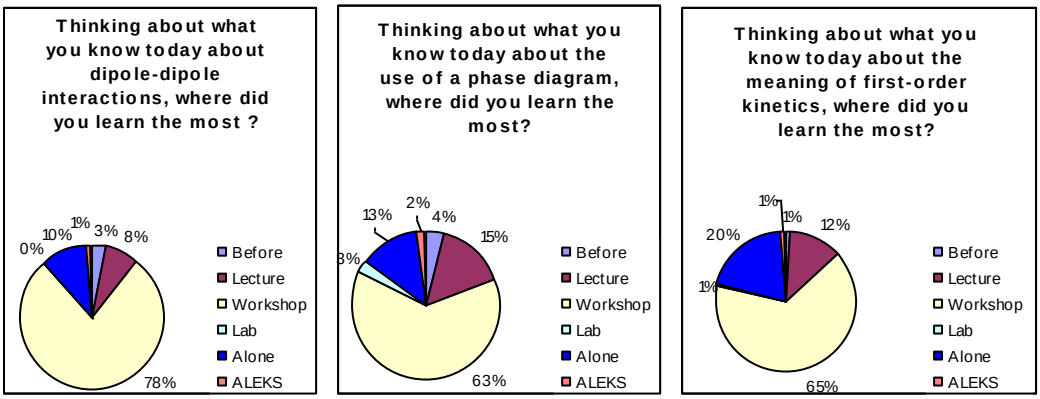
Why PLTL?

Students report they are more willing to ask a peer leader a question and are less intimidated in small group workshops where they are actively engaged. Our peer leaders:

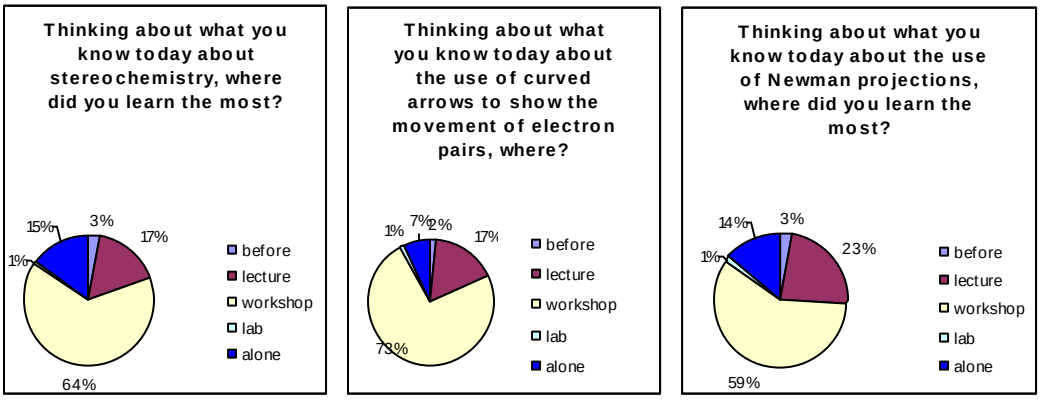
- Take 'ownership' in their workshops
- Willingly help one another
- Show leadership
- Exemplify teamwork
- Exude confidence
- Desire to see the students in their workshops do well
- Graduate
- Go on to graduate school
- Drive the creation of a new model in STEM education

When asked where and how they learn the most about specific course content, students repeatedly indicated that they learned most in workshop (Figure 2).

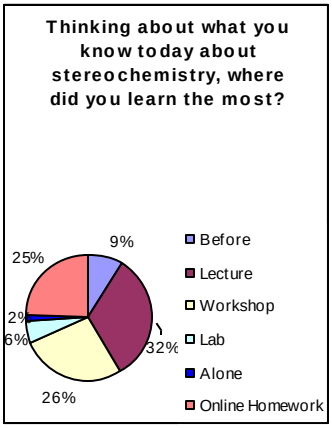
Chemistry 1306 (Second Semester General) Survey Results (n=145)

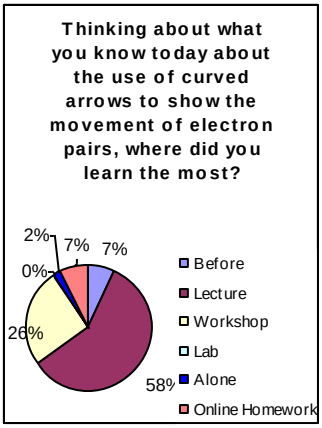


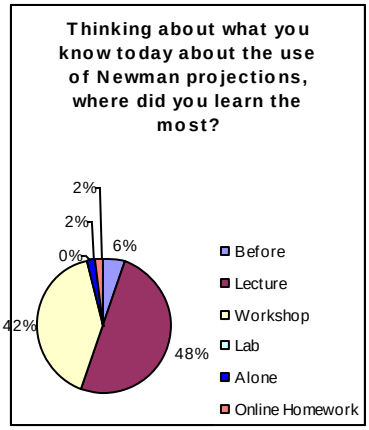
Organic Chemistry 2324 (Non-Majors First Semester Organic) (n=97)



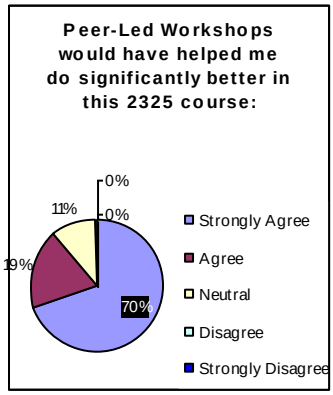
Organic Chemistry 2321 (Majors First Semester Organic) (n=52)

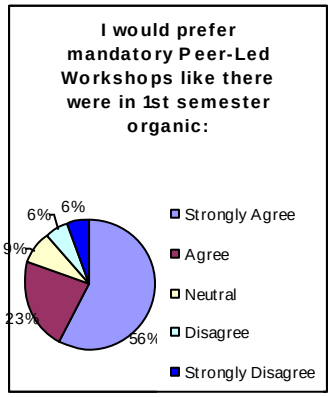


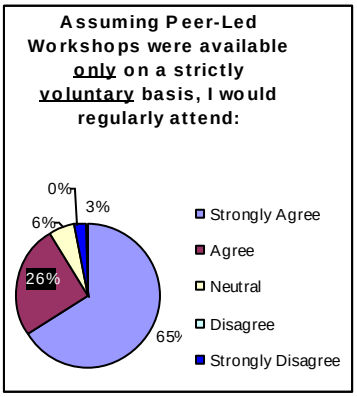




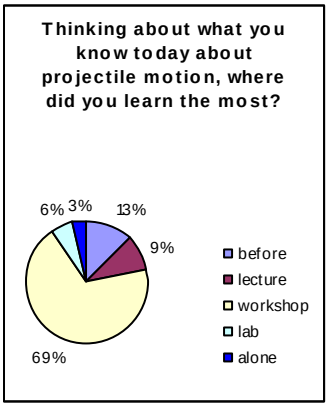
Organic Chemistry 2325 (Non-Majors Second Semester Organic) (n=35)

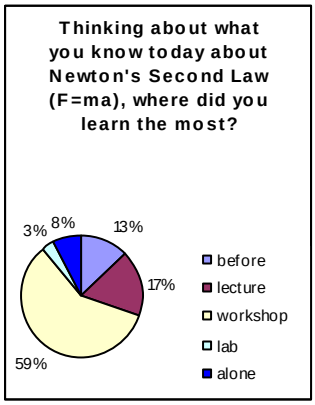


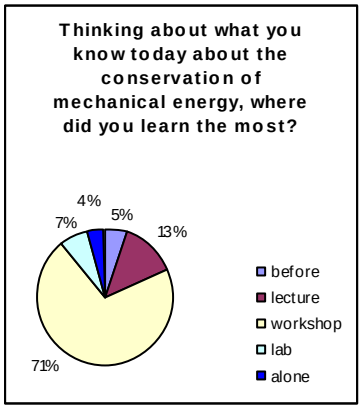




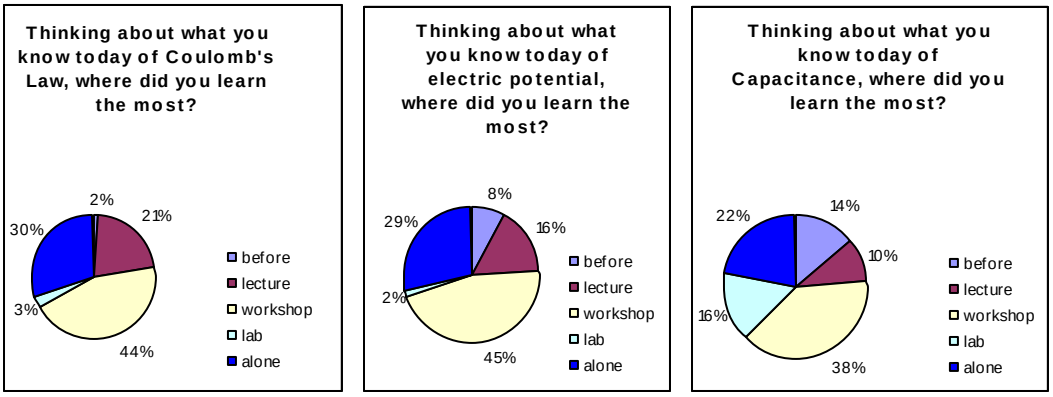
Physics 2420 (First Semester General Physics) (n=106)







Physics 2421 (Second Semester General Physics) (n=63)



Pre-Calculus (n=406)

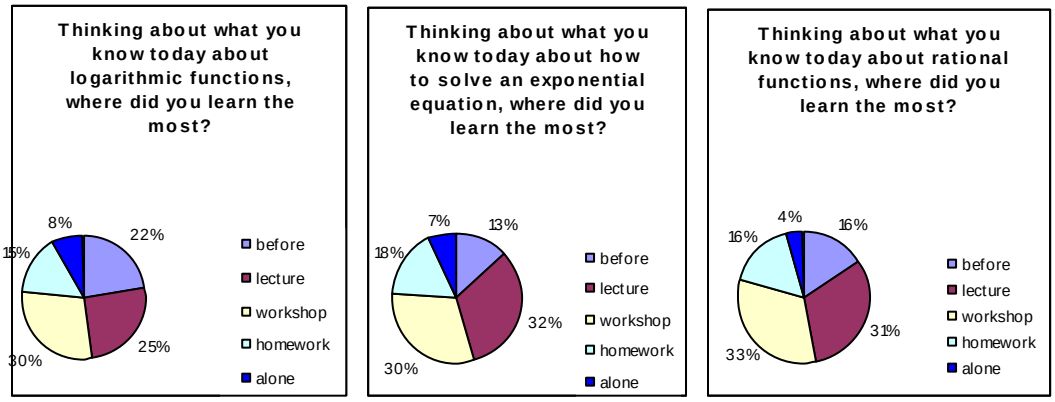


Figure 2: Undergraduate Student Pedagogy Perception

The STEP program has trained over 200 peer leaders who are also successful as students. The vast majority of undergraduates in the program complete their degrees (some have earned exceptional honors such as being recognized as Top Ten Seniors); many have gone on to pursue graduate or professional school (Figure 3). Peer leaders are paid hourly, are required to maintain at least a 3.0 grade point average, and have earned an A or B in the course that they are overseeing. With experience, these peer leaders become far more comfortable interacting with faculty members and speaking in meetings with faculty and administrators. Peer leaders frequently go on to an undergraduate research experience or other competitive opportunity as a result of their training as a peer leader.

Overall Retention

Student retention in the five courses with peer-led workshops has fluctuated modestly over the past five years (Figure 4). Students who graduated (most prevalent in Organic Chemistry and the second Physics course) are not included in the retention numbers. The overall goal of the NSF-funded STEM Talent Expansion Program (STEP) is to double STEM six-year graduation rates at UTEP. In analyzing UTEP's 21st century

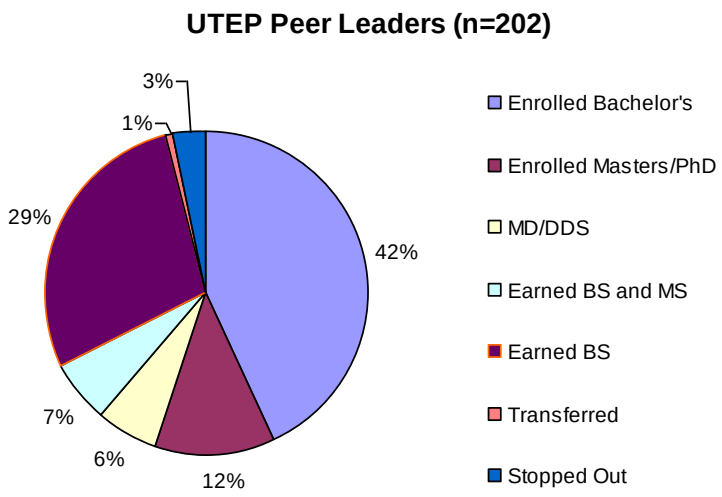


Figure 3: STEP Peer Leader Degree Completion

Retention in PLTL Courses					
	Pre-Calculus	**Phys 2420**	**Phys 2421**	**Gen Chem 2**	**OrganicChem**
2000-01	74.2%	84.1%	82.3%	79.2%	74.2%
2001-02	74.4%	85.6%	84.2%	79.1%	71.9%
2002-03	73.2%	88.6%	91.1%	79.3%	74.6%
2003-04	70.9%	84.4%	87.9%	79.1%	80.0%
2004-05	74.9%	84.9%	84.3%	82.1%	80.6%
2005-06	72.2%	86.9%	85.2%	80.6%	79.5%
2006-07	71.7%	80.8%	86.9%	84.6%	82.6%
2007-08	75.0%	84.0%	85.0%	83.4%	80.4%
2008-09	75.0%	89.1%	87.4%	83.0%	83.1%
2009-10	74.4%	83.9%	86.8%	87.1%	88.9%
2010-11	72.9%	83.7%	81.1%	84.2%	83.0%

Based on long semesters (no summers)
No graduation numbers included in retention
Honors section not included in Gen Chem 2
Physics majors not included in Phys

Figure 4: One Year Student Retention Rates

student population, it becomes clear that our predominately Hispanic (approximately 80%), majority low-income and first-in-their-family-to-complete-college student body do not follow the prescribed path of traditional college students. UTEP students commute to campus and most have family and work responsibilities that they are expected to fulfill in addition to their education commitments. We find:

- Only 50-60% of UTEP STEM B.S. degrees are awarded to students who begin in the fall in STEM and earn a degree within six years
- 25-33% of our STEM degrees are awarded to students who initially begin in non-STEM majors

- 20-25% of our degrees are awarded to students who take more than six calendar years (stop-outs who return)
- Approximately 20% of our B.S. degrees are awarded to students who begin in the spring or summer, thus are not tracked in our cohorts
- We are increasing the percentage of students beginning in the fall in STEM and earn a STEM degree within six years
- Our STEP goal, which we are well on our way of reaching, is to increase the STEM graduation rate to 50% by 2015 (Figure 5).

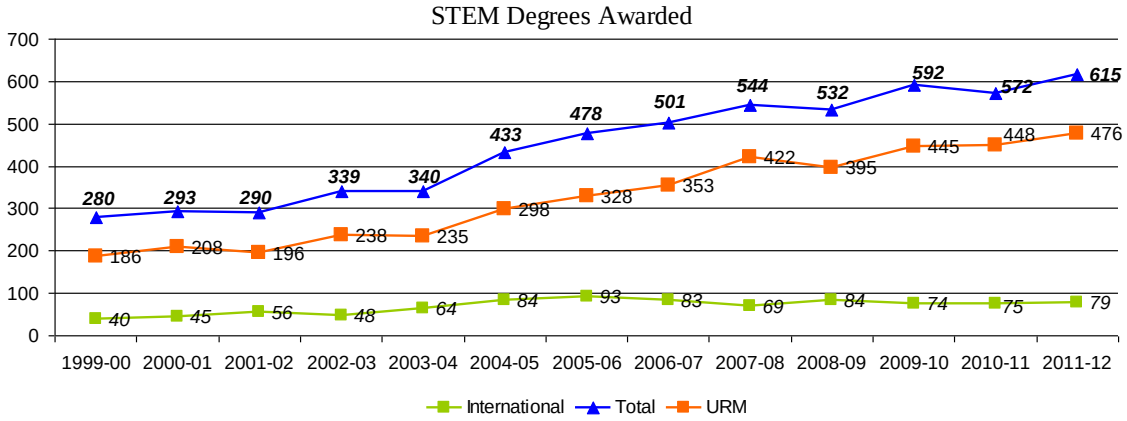


Figure 5: STEM Undergraduate Degrees

Remaining Challenge

Our primary remaining challenge is to develop similar leadership, presentation skills, and content knowledge gains in our students in course as those displayed by our peer leaders. It is thought that by modifying the workshops and making the student teams more responsible for leading the weekly workshop sessions (while peer leaders oversee these teams) that the better professional skill building and greater academic success experienced by the peer leaders also would be experienced by the students themselves.

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