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MENTORING: ALL BY COLLABORATION

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Mentoring: All By Collaboration

Abstract

UHD Peer-Team Led-Training has been a part of the mentoring training system for over 20 years. Professor Nakamura was one of the first trained in PLTL mathematics and has championed PLTL into mathematics, computer science, and chemistry disciplines over the years. In 2019 Dr. Parker included PLTL training workshops and trainees into several DOED MSEIP grant awards (2019-2023)(P120A190069, P120A210015, P120A230070). These funded grant awards supported PLTL training workshops for almost 30 trainees per year. This paper describes the training, the training's influence on leadership development, and the application to various groups where collaboration is critical to student development aimed at providing student support and growth.

Keywords: STEM, undergraduate support, collaboration, PLTL training

What is PLTL at UHD?

PLTL is an instructional model, characterized by six critical components, where trained student leaders engage groups of students in learning course materials in mathematics, the sciences, and other subjects. PLTL workshop is a group of 6 – 8 students that meets for approximately 1 to 2 hours each week to solve problems in a course under the guidance of a trained peer leader. The Six Critical Components that characterize the PLTL model are: 1. Workshop is integral to the course; 2. Faculty are involved with workshop; 3. Peer Leaders are trained and supervised; 4. Materials are appropriately challenging; 5. Suitable time and space are designated for workshop sessions; 6. There is institutional support. There are many studies conducted that PLTL workshops help STEM students understand and retain STEM concepts better.

This presentation will discuss the 23-year history of PLTL Program at University of Houston Downtown (UHD) including how we developed the Peer Leader Training Program using the PLTL philosophy, how we implemented the PLTL workshops in First Year Experience Seminar course, how we use the training program to train peer mentors and research leaders. We will also share some data from First Year Experience Seminar course, and the workshop materials for Peer Leader Training Program, Mathematics and Computer Science courses. Professor Nakamura will lead the session along with Dr. Mary Jo Parker assisting.

Rationale for PLTL Initiatives in First Year Experiences and Beyond

Peer-led Team-learning is a methodology training individual in facilitation through collaboration. Its focus is critical thinking through collaboration. In one study suggestions of improved relationships and improved people skills were noted (Tenney and Houck, 2004). In qualitative studies peer leaders reported through self-reflection and interviews that communication and pedagogical skills improved (Micari, Streitwieser, and Light, 2006). Another article reported that peer leaders thought they increased in self-confidence and developed an interest in teaching (Johnson and Loui, 2009). PLTL has been shown to demonstrate effectiveness in benefitting all students, especially underrepresented Hispanic and minority students in STEM (Narayanan, Powers, Premawardena, Colby, Mark, Rao, Smyth, and Knopp-Kelly, 2023). Results from one study indicate that PLTL has small but positive impact on gains associated with critical thinking in some science courses. Further, results suggest that PLTL has potential to improve undergraduate critical thinking capacity (Quitadamo, Brahler, and Crouch, 2009).

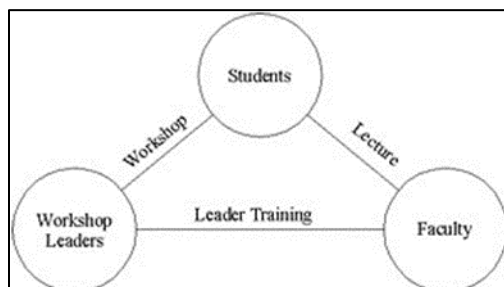
History of PLTL at University of Houston-Downtown

In Fall 2001 UHD was awarded a \$10,000 grant from PLTL Workshop Project Consortium to begin a pilot PLTL workshop in Mathematics courses. This workshop was led by Professor Mitsue Nakamura who attended training offered by the consortium. She was the first at UHD to receive training. Implementation of the PLTL workshops in selected College Algebra classes began during this same semester. In Summer 2004 PLTL was implemented into the precollege week-long START program for FTIC entering the Scholars Academy program. During the Fall 2004, PLTL was implemented into the College Success Program (CS) for Scholars Academy during the academic year. This program continues today. Peer leaders trained in PLTL were hired to facilitate the workshop in the START program, then these same students continued as Peer leaders into the freshman course known as CSP where all entering FTIC SA members were placed. In Fall 2006 Dr. Linda Becerra and Mitsue Nakamura published the College Algebra workshop materials in *Progressions*, the publication of the NSF-funded PLTL Workshop Project Dissemination grant (1999-2006). In Fall 2007 until Spring 2011, PLTL was implemented into workshops in General Biology at UHD. During Fall 2007 until present, a new Peer Leader training program was developed using the PLTL Workshop Style methodology, then implemented. In Spring 2008 implementation of PLTL workshops were implemented in select Introduction to Computer Science with C++. In Fall 2011 Mitsue Nakamura and Dr. Ongard Sirisaengtaksin become founding members of Peer-Led Team Learning International Society. Both UHD leaders become Board of Director members from 2012 to current. In Fall 2012 UHD PLTL implemented online workshops in selected classes of Introduction to Computer Science with C++ (CS I). In Spring 2013 PLTL workshops were implemented in select courses of Introduction to Data Structures and Algorithms (CS II). In Spring 2016 a research investigation of trainability of high school peer leaders was undertaken. At the same time period UHD formed a PLTL Club as a student organization. In the Fall 2016 PLTL workshops were available in the PLTL lab in the following disciplines: CS I, CS II, Calculus I, Calculus II, Discrete Math, Linear Algebra, Technology (Excel, Maple, Matlab, and Simulink) to all UHD undergraduates. In Summer 2016 through now selected peer leaders work as research leaders for undergraduate research programs including Texas Workforce Commission (TWC) project, Minority Science and Engineering Improvement Program (MSEIP) Department of Education project, and Texas

Talent Connections (TTC) project. In Summer 2019 to present online and face-to-face workshops were developed for Peer Leader training programs focused on CS I, CS II, Calculus I, Calculus II, Discrete Math, Linear Algebra, and Technology (Excel, Maple, Matlab, and Simulink).

PLTL Learning Community at UHD

We do not have a learning specialist, so we use the following modified model:



Recruitment of Peer Leaders

Students must have completed PreCalculus and/or Calculus I with a grade of A or B for College Algebra, and Introduction to Computer Science with C++ and Introduction to Data Structures and Algorithms with a grade of A or B for Introduction to Computer Science with C++ to apply. The majority of Peer Leaders are recruited from UHD Scholars Academy (SA) which is a competitive scholarship program to support students in STEM fields.

Training Peer Leaders 2001 – 2006

A 1.5-hour training session was held once a week guided by Mitsue Nakamura. Leaders worked on the workshop materials as a group and discussed the topics from the Peer-Led Team Learning: A Handbook for Team Leaders by Roth, Goldstein and Marcus (2001, Pearson Prentice Hall). They discussed Do's and Don'ts sharing their experiences from the previous workshop. They also gave feedback on the materials that were used in the previous workshop. Leaders were asked to turn in weekly Workshop Leaders logs.

2007 – Present

The Peer-Led Team Learning (PLTL) training model was adapted to better suit the needs of both the students and the university by incorporating the workshop ideal into the training itself. UHD leaders experience first-hand the benefits of the workshop style and are given the chance to become familiar with the student's perspective before they begin running workshops themselves. The number of prospective leaders to be trained every semester has been reduced in accordance with the workshop style. Approximately 8 students undergo training per semester, with 11 sessions in total. The group meets for 1 hour each week under the guidance of a peer-coordinator to discuss topics from the *Peer-Led Team Learning: A Handbook for Team Leaders*. Peer-coordinators are previously trained leaders chosen due to their interest in education; their objective is to guide the leaders through their training in the manner that workshops should be

conducted. Leaders are required to read through the section of the Handbook to be discussed that week, reflect over, and then answer 3-6 questions as assignments so that they can be prepared to collaborate in the workshop. The content materials used in the training workshops are created by the faculty supervisor, then given to the peer-coordinator to modify according to the group's particular needs. The coordinator offers all modifications for approval to the supervisor as well as providing reviews after every workshop session is completed to ensure a constant flow of communication throughout the semester. All the peer tutors who work in the Commutative Learning Community Center (CLCC) and PLTL Lab have gone through PLTL training workshops. Since 2019 when the first of three consecutive MSEIP awards (P120A190069, P120A210015, and P120A230070) were obtained, undergraduates have been provided a modest stipend for PLTL training during fall, spring and summer I semesters. Almost 30 per year for the last three years have been trained equaling 90+ undergraduates training in PLTL workshop methodology.

Evidence of First Year Student Success

Table 1. UHD SA Two Decades of FTIC Retention.

	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22
Begin	20	28	32	38	39	30	38	28	30	40	22	18	36
Compl	15	26	27	34	32	25	28	23	25	30	16	13	26
Total FTIC	399												
Total Retained	320												
1 st Yr Retention	80.2%												

Some Observations on Peer Leaders

We have observed the following regarding Peer Leaders: PLTL experience provides our students with great leadership skills. PLTL experience makes our students hungry for more mathematical and scientific knowledge. PLTL experience encourages our students to engage in undergraduate research. PLTL experience promotes a pathway for our students to apply for and succeed in professional schools and graduate school.

Future Studies Planned

UHD has plans to collect data on former peer leaders, using the survey instrument: "Benefits of Peer Leadership". Mitsue Nakamura intends to participate in the research project on "Sense of Belonging" – Collaboration with University of Texas at El Paso (UTEP) and Florida International University (FIU). Further, another project will focus on trainability of high school students as peer leaders.

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