



PEER-LED TEAM LEARNING  
INTERNATIONAL SOCIETY



# A SHORT GUIDE TO THE PRACTICE OF PEER-LED TEAM LEARNING

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## HOW DO I GET STARTED?

Dear Colleague Interested in Peer-Led Team Learning:

Good news about your enthusiasm for the PLTL idea. I think the most important thing you can do is to attend one of the PLTL workshops or conferences. Try to take a team with you—e.g., the Director of Learning Assistance Center, some potential leaders, another colleague or two. Co-opt them into the model.

The process for choosing the leaders is discussed in some detail in the *Peer-Led Team Learning Guidebook* (see box, page 29). I think you will have lots of good applicants because it works so well, because it works closely with you, because it is so much fun and provides so much satisfaction. Anyway, it is better than most other campus jobs. I write a letter of invitation to the good students in my course; it is a flattering letter that also tells what they might get out of the experience. A generic version is in the appendix to the *Guidebook*. At the University of Rochester, we (at least one faculty member, coordinator and current workshop leader) then interview the students in groups (like a workshop). We base the interviews on scenarios that come up in workshop (e.g., one student talks all the time—what do you do about it?). We choose leaders based on their interpersonal skills and insights demonstrated in the group interview. We also pay attention to their grades.

As part of the interview process, we tell the new leaders that they have to take a leader training class. We meet Friday afternoons when there are fewer scheduling conflicts. We finish the recruiting process before the leaders register for the next semester, so they know they have to fit our class into their schedule. Everyone manages to make it fit. Do not wait until Fall when they have made other commitments for their time. We finish our recruiting mid-April with the contract-signing.

I think that it is essential that you find ways to work cooperatively with the Director of the Learning Assistance Center. The Director can be a great ally for you in developing PLTL, providing know-how, leader training and even budget support. Students' contact with the Learning Assistance Center is improved by implementing the PLTL workshops. The Center and your involvement will reach more students, as opposed to one-on-one tutoring or other programs. The Center may come to see that PLTL is a better way to spend the money.

I shoot for eight students/team. If this requires too many leaders, consider the wisdom of starting with half the class—let them volunteer. Then you can scale up next year. This simplifies and provides a built-in control.

Copy everything you can from us ([www.pltlis.org](http://www.pltlis.org)) and let us know if we can help in other ways. Carry on!

*Jack Kampmeier*



# 1. INTEGRAL TO THE COURSE

That the workshop is integral to the course is an overarching concept that in one sense integrates all of the critical components. The workshop is part of the fabric of the course. This is closely related to faculty involvement – the faculty has the primary responsibility to see to it that the workshop is closely related to other course components.

The primary instructional component is in place. But consider the following questions:

- ⇒ Does each group of six to eight students meet with a peer leader in a weekly session?
- ⇒ Is there a formal notification of the session, such as being listed on the course schedule?
- ⇒ Does the faculty voice support for the workshop in lecture and often refer to workshop content as part of the lecture?
- ⇒ Are the content and practice of the workshop closely related to the lecture? For instance, a typical practice is to have two or three lecture hours to set the stage for the PLTL session. If

that is the case, then the lecturer should be discussing material that is relevant (as in *just in time* teaching).

- ⇒ Do student leaders have practice connecting pedagogy and content of the workshop?
- ⇒ Is the practice of the workshop closely tied to the learning/performance goals that the instructor has in mind?

In practice the best way to ensure that the PLTL workshop is integral to the course is for the instructor to engage in good communication with the workshop leaders. If allowed to present their opinions in a non-threatening manner (through written feedback, for instance), they can alert the faculty member when things are going awry in the workshop. Peer leaders will be very sensitive to the students' needs—and their input can be invaluable. One of the most important things faculty can do is to listen to the peer leaders, setting aside preconceptions and opening the windows of perception to students' views!

*David Gosser*

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## THREE APPROACHES TO INTEGRATING WORKSHOP IN THE COURSE

With regard to attendance, three approaches have emerged: (1) all students from a PLTL section are required to attend; (2) students make the decision at the start of the semester, and if they choose the workshops they must attend; (3) students may drop in on a week- to-week basis. The model recommends the first approach with participation by all, but in this case leaders must sometimes work hard to engage those who are less motivated. The third approach, drop-in sessions, generally fail to provide continuity and real problem-solving experiences. Many sites have selected the second approach, namely to implement PLTL with those students who elect to participate—usually 30%

to 60%. This is done either for lack of resources—financial, personnel for leaders, space; or, as mentioned, because of the belief or experience that not all students will profit from the workshops. Many sites have had success with this approach—in terms of student performance and overall satisfaction with implementation.

*Leo Gafney*

### 1.

Integrated with the Course:

- Students view workshop as important to learning
- Leaders are aware of lecture approach
- Lecturer refers to workshops

THE CASE FOR MANDATORY WORKSHOPS: SEE LUCILLE GARMON'S PAPERS:

2012 CONFERENCE PROCEEDINGS

2013 CONFERENCE PROCEEDINGS

PLTLIS.ORG

## 2.

## Instructor's Involvement

- Preview of problems with peer leaders
- Preparation and review of materials
- Available to students and student leaders

## 2. FACULTY INVOLVEMENT

One of the six Critical Components of the Peer-Led Team Learning (PLTL) model addresses the direct role of the instructor in implementing workshops:

*Course professors are involved in the selection of materials, the training and supervision of peer leaders, and they review the progress of the workshop program.*

The very first major implementation issue that faculty PLTL adopters may face is only implicit in the critical component statement: the instructor's involvement in adapting or redesigning the structure of the course to better accommodate peer-led team learning. Traditional science courses have changed relatively little in their structure over the past decades. So, how is the workshop to be integrated into this structure? Where possible, the workshop session should be at least 90 minutes in duration, because group problem-solving is a labor-intensive activity. This type of structure is not always possible. Institutional constraints often shape the form that PLTL takes locally, especially in the early stages. It is the adopter's responsibility, consistent with local constraints, to design the effective integration of the PLTL experience into the overall course structure. My own experience in teaching an evening General Chemistry section over the past two years has led to a substantial re-allocation of instructional time. My one hour and 45 minute weekly workshops have been built from corresponding reductions in lecture and laboratory time, and I hope that the course structure will continue to change.

The availability of workshop materials in several levels of chemistry is a distinct advantage to chemistry faculty wishing to implement PLTL. When I implemented PLTL, I decided to use the classic *General Chemistry Workbook* (Gosser, Stozak, and Cracolice, 2001). This (or perhaps, any) standard workbook presented its own set of implementation issues. Such issues take the form of questions like: Is the reading level appropriate for my students? Is there enough descriptive material provided in the workshop units? What about the level of difficulty of the workshop activities? Can the workshops actually be completed within the time allotted?

Another issue relates to the coverage and ordering of topics within the course.

Is there a departmental (or even state) requirement that prescribes the learning objectives and/or outcomes for the course? My experience is probably typical of most PLTL adopters – a quick realization that I would need to adapt the available workshop materials for my own course. Where am I in this process? Currently, I am working on my own “version 4.0 (!)” of my adaptation of the *General Chemistry Workbook*. Nevertheless, having a starting point for adaptation, as I did and you can, is very important and very, very helpful.

More often than not, it falls to the faculty PLTL adopter to recruit the workshop leaders. Ideally, colleagues in the department can be solicited to suggest potential leaders and to spread the word about this opportunity among their classes. Some enterprising adopters seek permission to visit other classes to talk up the advantages of serving as a workshop leader. An alternative approach is to solicit leader candidates through mailings or general announcements. Having the assistance of a supportive learning specialist can be very helpful when it comes time to choose the slate of leaders. In addition to an understanding of the basic subject matter, human interaction skills are very important in the makeup of a strong workshop leader. Recognize that recruiting workshop leaders may not be so easy. Most community college faculty are well aware of the difficulties that we face in this regard. Our pool of potential leaders is narrowed by a number of factors, including student transfers, changing work schedules, and heavy personal responsibilities. This means that recruitment must be in full swing almost all the time.

Responsibility for the training and supervision of student workshop leaders is another major concern for the PLTL adopter. A learning specialist colleague can help enormously in sharing this responsibility. At some institutions, workshop leaders fall under the management of a tutoring or learning center, an arrangement that also helps to ease the faculty burden. But, more often than not, especially at small institu-

tions, the PLTL adopter will be directly involved in these responsibilities as well. The *Peer-Led Team Learning Guidebook* is quite helpful in dealing with these issues.

Finally, the PLTL adopter must recognize the crucial importance of evaluation. Evaluation is important at two distinct levels, internal and external. Documenting and charting student performance and outcomes are an essential part of instructional innovation, and can often make the difference between a sustainable or a short-lived PLTL effort. Institutional resources generally flow in the direction of those activities that can be demonstrated to have a positive impact on key goals and objectives. It is also important

in this respect to assess student attitudes toward learning with PLTL, along with quantitative measures of their performance. Students' attitude toward their learning experience can be an important factor in determining subsequent retention.

The external component of evaluation emphasizes one's participation in a national program of instructional reform. Peer-Led Team Learning's growing data base of evaluation findings at varied and diverse institutions is a major factor in encouraging and facilitating PLTL implementation. Each of us, as an individual adopter of the PLTL model, has an important role to play in supporting the dissemination and successful implementation of the model.

*Dennis Bartow*

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## THE IMPORTANCE OF FACULTY INVOLVEMENT

The PLTL model recommends that the professor teaching the course participate in the implementation of workshops, for example, in the selection and preparation of materials, and in the training and supervision of leaders—meeting with them each week. This approach provides links among the students, workshop leaders, and professors, and tends to make the workshop a more significant learning experience. Some sites, to economize or because some faculty are more ready and willing to supervise the

leaders, have arranged for the leaders of several sections with different professors be trained and supervised by one professor, sometimes assisted by an experienced leader. In these cases, the less-involved lecturers tend to view the workshops as useful but not critical to students' success, and when the workshops are threatened such lecturers are less likely to champion PLTL.

*Leo Gafney*

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## RESOURCES - WWW.PLTLLIS.ORG

Resources on the PLTLIS website include articles published in *Progressions*, the Workshop Project newsletter.

Conference Proceedings are papers based on presentations and posters from annual PLTLIS conferences (2012-2015). These include evaluation results of longitudinal studies, description of campus programs, as well as practice strategies by Peer Leaders.

Contacts is a partial list of practitioners who can be contacted for information on their campus program.

PLTL in Practice includes videos filmed by pictographer Tony West, capturing various aspects of PLTL in practice. There is also a growing collection of videos as part of the PLTLIS YouTube channel.

Publications include peer-reviewed and other papers written about the use and results of the practice of PLTL from a wide variety of sources. These are arranged by year of publication.

Workbooks Project—PLTLIS serves as a publisher for course materials developed by campus teams of Peer Leaders and faculty. Revenue after expenses supports PLTL Programs. For more information, go to <https://shop.pltlis.org/>

Forum is a feature for discussion on questions of practice of Peer-Led Team Learning.

## WHAT CAN FACULTY DO TO MAKE OUR JOB EASIER? PEER LEADERS' SUGGESTIONS

*These [key ideas] are the role of the professor and peer leaders to encourage active learning among the students, ensuring consistency in the campus PLTL program, and supporting feedback and networking within the PLTL team.*

*Professors should remember that peer leaders are not to take on the responsibility of teaching "new" content not covered in lecture.*

During the peer leader breakout session at the Leadership Conference on Peer-Led Team Learning in Missoula, Montana in August 2002, peer leaders discussed possible ways to improve the workshop model in general. The peer leaders at this conference first discussed the way the PLTL program worked at their institution as well as their workshop model/structure. As a group, the peer leaders brought up several points regarding the administration of PLTL at each campus. These points were compiled as suggestions to faculty and those managing the campus program, to help maintain a better PLTL program and improve the quality of education that students receive.

### Suggestions for Supporting Peer Leaders

1. The professor should incorporate cooperative learning by encouraging student input to "interrupt" the lectures.
2. Professors should remember that peer leaders are not to take on the responsibility of teaching "new" content not covered in lecture.
3. Education specialists should be encouraged to join the PLTL team, and be an advocate/mediator when there is a peer leader-professor confrontation.
4. When a course has several instructors, peer leaders should be assured that there is faculty consistency over material to be covered and tested.
5. When there are different workshop sessions with several peer leaders, faculty should have uniform methods of covering the same material to ensure consistency.
6. Faculty should work with the peer leaders to have workshop run-throughs before the workshop, to focus more on techniques to be used to cover as many different learning styles as possible, and to ensure that peer leaders fully understand what the professor wants them to cover.
7. As part of the recruitment process for peer leaders, faculty and learning spe-

cialists should promote workshops through campus advertising, and follow up with a formal interview process, and applicants should present a resume and letter of recommendation to become workshop leaders in the PLTL programs.

8. Those managing the Workshop program should conduct mid-semester evaluations with feedback to student leaders to realize the progress of the workshop.
9. A message board should be established to create a support information center, not only for the students but also for peer leaders and professors.
10. Peer leaders should be trained, and informed of the sources available to improve the program by networking with other peer leaders nationwide.

There are three key ideas in which the points above have been arranged. These are the role of the professor and peer leaders to encourage active learning among the students, ensuring consistency in the campus PLTL program, and supporting feedback and networking within the PLTL team. The idea is to maintain a balance of input and output, and good communication among the team members involved (professors, peer leaders, learning specialist, students) to aid in delivering the best quality of education that can be achieved.

*Monica Valdez  
University of Texas, El Paso*

*With assistance from peer leaders from the University of Houston, Downtown, the Borough of Manhattan Community College, the City College of New York, the University of Montana, the University of Texas, El Paso, and others.*



### 3. TRAINING PEER LEADERS, RECRUITMENT AND SELECTION

In preparing to implement a PLTL course, one of the first tasks is to find undergraduate leaders, one for each six to eight students who will take the course. The first time around, one is likely to look for advanced students (majors) and for students who have done well in a recent class. It is helpful to have a formalized application and acceptance process. This will serve to clarify the roles and responsibilities of the faculty and the leaders, and will be a first step in leader training.

One method of interviewing students that has been successful is a group interview, where a number of applicants are interviewed in a workshop style setting. Applicants' responses to questions relating to typical workshop settings will provide a strong indication of their potential for group leadership (ability to communicate, listening, and attitudes towards assisting other students). At most campuses, the leaders are compensated at a level that is commensurate with local standards. Peer leaders typically earn \$400 to \$500 for a semester leading a group in a course. The time commitment is the actual workshop (two hours) and participation in leader training (one to three hours).

Leader training will often begin with a one or two day pre-semester meeting, led by a team consisting of faculty, experienced leaders, and a learning specialist. New peer leaders become acquainted through participatory workshops, with introductory content of the first workshop; diversity of learning styles; principles of collaborative learning; and active listening. In this setting they have a chance to voice their concerns and apprehensions and also to work with experienced leaders in preparing possible solutions and answers to their questions such as "What should I do if a student demands answers?" "What should I do with a dominant student or a shy student?" or "What are the boundaries that I can set in interacting with my group?"

Following this introductory meeting, sometimes called "Orientation," students need to have follow-up preparation and training in both content and leadership. This can be obtained in a number of

ways, but in any case the direct involvement of the faculty is critical. The most common manner in which students are prepared is for the faculty to lead a workshop each week with the peer leaders as the members of the group. In this way, the faculty can model the desired listening and collaborative learning skills. Peer leaders can be prepared in the content and can see what is expected of them in a workshop setting.

The peer leaders are expected to facilitate discussion and debate among the group members, and are not to lecture. To this end, it is very helpful for leaders to have explicit instruction in various collaborative learning methods such as pair problem-solving, structured round robin, brainstorming, etc. On several campuses there is a formal PLTL leader training course which may have one or two credits. Leaders are asked to write reflective journals, which often illustrate their own personal growth through the experience of peer leadership. The course can be offered in collaboration with a learning assistance center or school of education. This collaboration introduces a partnership outside the discipline that can be very productive. The learning specialist, a generic term that denotes an individual whose specialty is in the areas of student assistance, cognitive science, science education, or adult learning, can bring an important perspective and provide great assistance to the faculty in balancing the content with an attention to group leadership and pedagogy. The partnership also can introduce assistance in forming alliances and obtaining institutional funding to do PLTL workshops.

David Gosser

### 3.

#### Peer Leaders

Are:

- Skilled with groups;
- Facilitator rather than teacher
- Trained and supervised
- Have knowledge of the discipline and problem-solving skills

*For more information regarding peer leader training, see Resources, Leader Training, at [www.pltlis.org](http://www.pltlis.org).*

*A valuable resource is "Facilitating Team-Based Learning" (2019), by Andrea McWilliams, A.E. Dreyfuss, and James E. Becvar; PLTLIS Press. Also available in Spanish: "Facilitando el Aprendizaje en Equipos."*

## PEER LEADER TRAINING

Why is leader training a critical component? Without it workshop leaders tend to default to what they already are familiar with, that is, lecture and recitation.

Peer leaders are often recruited from current students taking a course., although colleges using the PLTL workshop approach have variations in methods of selection and training.

### Components of Leader Training Courses

PLTL affiliate campuses offer a variety of training options for peer leaders. The most formal provides an orientation seminar before the term starts, and continues for part or all the semester with a leader training course. Some campuses opt for the orientation session only, and some condense the training to weekly meetings with the faculty member or student coordinator, where discussions of pedagogical techniques are combined with the week's problems.

A common practice is a two-day orientation seminar and a one-credit course that introduce students to the Workshop Model, and include the following components:

- ◆ use of icebreakers;

- ◆ awareness of different learning styles;
- ◆ equity issues;
- ◆ examination of group dynamics and research on cooperative learning;
- ◆ pedagogical tools such as pair problem-solving, construction of models, round robin, concept mapping, etc.;
- ◆ introduction to developmental and learning theories (e.g., Vygotsky, Perry, Belenky, Deci & Ryan);
- ◆ skill and leadership development through role playing;
- ◆ assessment of students' learning.

These topics are subsequently presented in greater depth during the leader training course, which also requires reflective journal writing and a final project. The orientation seminar and the course allow workshop leaders to try different pedagogical tools, thus promoting active student learning and skills development. The coursework also provides a forum for collaboration between faculty in specific disciplines and specialists in learning.

*Ellen Goldstein*

## WHY TRAINING IS VITAL

The role of the peer leader distinguishes PLTL from other programs such as Supplemental Instruction, recitations, group study, and tutoring. The leaders are trained to see themselves not as teachers but as important facilitators of learning, working closely with the professor—becoming strong guides in the discipline and also advocates for the students. While this need is made clear to new adopters, it sometimes happens that scheduling problems, professorial commitments, or a lack of conviction about the importance of on-going supervision leads PLTL programs to reduce the emphasis on weekly meet-

ings, or hold meetings that a majority of leaders do not attend. In this case, the sense of a real unified program is lost.

Each workshop depends on the skill, commitments, and industry of its leader. The leaders themselves lose their sense of belonging to a significant enterprise. Ultimately, the foundations of the program become so weak that continuance is problematic. Abandoning weekly leader meetings has been, in a number of cases, the preamble to abandonment of the program.

*Leo Gafney*

*But the greatest strength of the PLTL model is that it presents a structure that creates a real sense of community of scholars, where students can realize the ultimate goal of taking responsibility for their own learning.*

*We can “unleash” the power of students as leaders and participants in courses, by providing them with a well-structured but open environment where they are free to make mistakes and learn from, and with the guidance of, their leader and their fellow classmates.*

## 4. CHALLENGING MATERIALS FOR WORKSHOPS

What materials should be used in PLTL workshops? This simple question is often the beginning of a long process, which can result in re-examining course content as well as pedagogy. The concepts to be examined in the workshop should already have been introduced in the lecture by the instructor. The instructor should identify one or two key ideas to be explored in a given workshop. A good workshop unit is not a random collection of problems. The problems should build on one another to help develop a deeper understanding of a core concept. Problems should be constructed around a theme. Hence the construction of workshop problems, while imposing some constraints on faculty, also provides an opportunity and the freedom to be creative. The challenge is to create problems that are suited for a unique learning environment, keeping in mind the structure and dynamics of the workshop.

Constructing appropriate materials might involve the following process:

- setting benchmarks for learning in the course; the benchmarks may then lead to re-examining the content and structure of the course materials normally used;
- selecting and developing materials that are designed to meet the goals implicit in the benchmarks;
- testing of the materials by student leaders and students;
- revising the materials in response to the feedback from the students and the peer leaders.

The materials should:

- assist the leader in engaging the students in a productive discussion;
- allow the students to practice speaking the language of the discipline;

- be constructed while keeping in mind the background of the students; what may be drill for one group of students may be very challenging for another group;
- be relevant;
- be challenging enough to require a group effort;
- appeal to different learning styles and therefore should involve a variety of activities such as model building, brainstorming, pair problem-solving, round robin format etc.;
- present problems that have different methods of solving them, so that the merits of each can be examined.

Solutions to the workshop problems should not be provided since the focus in a workshop is on the process of finding and collectively evaluating answers and arriving at a consensus. Confidence in the solution should come from debate and discussion, not from consulting the “answer key.”

### Pitfalls in Writing Materials

There are pitfalls to watch out for when writing materials:

- a problem may be too difficult. The difficulty level should be just slightly above the level at which students are now competent in solving problems;
- more time and effort than expected may be required to construct good problems for group work. The writer(s) should continually consult with the student leaders and revise the problems until a good match to student abilities is achieved.

*Pratibha Varma-Nelson*

### DESIGNING MATERIALS FOR WORKSHOP

A straightforward question in a text that requests a numerical answer can be improved by structuring the problem into parts and inquiring of the group to explain each part, reflect on the answers, explain to their neighbors, compare methods, and create flowcharts and visual representations of their thought processes.

The small group setting is perfect for molecular model building and “games” of simulation. Such intellectual model-building coupled with concrete representations can develop students’ understanding of concepts that appear more abstract (e.g., equations of kinetics).

*David Gosser*

## 4.

### Materials

- Fit with course;
- Relate to tests
- Are engaging and appropriately challenging

*The small group setting is perfect for the introduction of model-building and intellectual processes characteristic of the discipline.*

*The workshop environment is open to many different visions and theories of curricular design.*

*In the PLTL workshop, students are embarked on a venture of self-discovery, in collaboration with their peers. The existence of an answer in black and white will short-circuit the process.*

It is tempting when designing materials for a peer-led team learning workshop to construct a set of worked-out answers, an answer key. However, many PLTL practitioners are convinced that the best practice of PLTL is obtained without reliance on formal answer keys. Lack of an answer key creates some initial discomfort for faculty, leaders and students. Faculty are concerned that without an answer key students are in danger of obtaining false information. Students and peer leaders may feel more comfortable with a set of answers available. John Dewey has been credited with coining the term “critical thinking” as “an active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and further conclusions to which it tends.” Conclusions are arrived at independent of appeal to an external authority. The impact on PLTL workshops is three-fold:

1. In the PLTL workshop, students are embarked on a venture of self-discovery, in collaboration with their peers. The existence of an answer in black and white will short-circuit the process. Students build self-confidence through authentic problem-solving, without reliance on answers.
2. A valuable part of the PLTL process is that several different and equally valid approaches to solving a problem will be explored. Answer keys cannot foresee this, and typically emphasize a unique problem-solving path.

3. Similar to a research group meeting, conclusions are reached through debate, discussion, and consensus, and the learning will be deeper and longer-lasting than that obtained by a quick check of the answer key.

There are useful ways in which to build the necessary support for leaders and students. Leaders are prepared for workshops by engaging in the material with the faculty. This is the key step where misconceptions and errors can be confronted and discussed. By working with the faculty as guides, peer leaders understand the complexity of the problem-solving process and can work with their “home-grown” answers that exist in their internalized understanding of the material. In designing the materials, students can be assisted by providing appropriate “scaffolding” in designing problems, so that inquiry is guided and supported.

The issue of the answer key has generated controversy and student engagement. At the 2001 PLTL Leadership meeting (Goucher College, MD) students were asked to consider this issue and report to the group. The result was a skit, “The Answer Key” which, in a lighthearted way, made the point that in life there are no answer keys (see p. 32).

*David Gosser*

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## THE NECESSITY FOR CHALLENGING MATERIALS

The model recommends materials that are challenging but doable, and appropriate for group work. Often, significant adaptations to existing materials are made in order for the materials to fit the pace, emphasis, conceptual level, textbook approach, and other variables in the course. Students are quick to recognize it when workshop materials are not closely connected to the lecture and textbook. In addition, they are particularly bothered when workshops do not seem to prepare them for tests. This expectation sometimes creates problems

because most professors do not want the workshops to be simply drill and practice for tests. But instructors generally appreciate students’ desires to improve their grades on the basis of workshop participation, and develop materials that develop concepts and enhance skills, along with abilities in creative problem solving.

*Leo Gafney*

## 5. ORGANIZATIONAL ISSUES

Having the right physical environment will go a long way to making the workshop program successful. Ideally, each workshop group should meet in a quiet space that has a table, comfortable chairs, and chalkboard. The table should be large enough to accommodate six to eight students and the peer leader. The chalkboard will allow students and the peer leader to illustrate and discuss solutions to problems in full view of the entire group. A small classroom where students will not be distracted by outside noise or discussion from other groups is the perfect environment.

Students, especially in community colleges, are frequently intimidated by large groups and are reluctant to present their ideas or solutions to a problem to a large group or in an environment where they feel that all eyes are on them. The small, quiet space makes them feel more comfortable and after a few weeks, students will engage in animated discussions at the chalkboard.

In reality, however, it is often difficult to get the ideal environment and it may be necessary to make compromises. Whatever the compromise, the physical facilities should be such that all students can see what's being written and hear what's being discussed.

If it's necessary to have two or more groups in the same room, the room should be large enough so the groups can work at a chalkboard or newsprint stand. Groups should be far enough apart that they won't distract each other. In some programs, when several groups are meeting in the same room, portable white boards can be passed around the group so students can write their contribution to the problem and hold it up for the entire group to see. Learning centers can frequently provide an environment where several groups of students can meet simultaneously and have access to tables and chalkboards. Science laboratories can also provide an adequate meeting space for one or more groups.

Whatever the environment, the guiding principle is to create a space for the workshop where students will feel comfortable discussing science and presenting their ideas, and where they will be free from as many outside distractions as possible.

*Vic Strozak*

## ASSURING OPTIMAL ARRANGEMENTS

The time recommended for workshops is two hours. Ninety minutes can work, but when workshops are only an hour, there are generally complaints that students cannot spend the time on protracted problem-solving that is intended to be a key workshop experience, and the leaders find it difficult to keep up with the full reinforcement of the lecture material.

At a number of campuses, workshops have been scheduled with students from several lecture sections. This can work, but there are frequent complaints that the

pace, emphasis, and manner of explanation can vary considerably from one section to another, making the workshops less effective.

The size of six to eight students in a group has been repeatedly emphasized. With fewer students, it is often difficult to develop group spirit; with ten or more it is difficult for a leader to keep in close contact with individuals and small groups as they work.

*Leo Gafney*

5.  
Organizational  
Arrangements
- Time: 1.5 to 2 hours
  - Space: tables and chairs grouped for discussion;
  - Noise considerations
  - Group size: 6 to 8 students

FOR MORE ON THE ROLE OF THE LEARNING ENVIRONMENT, SEE MARK CRACOLICE'S PAPER, UNDER RESOURCES, SUSTAINING A PLTL PROGRAM AT WWW.PLTLLIS.ORG

6.  
Evidence of  
Support and  
Growth  
· In disciplines  
and courses  
· Implementa-  
tion sup-  
port  
· Institutional  
support

## 6. INSTITUTIONALIZATION

Newcomers to the Peer-Led Team Learning (PLTL) model often claim that it is expensive. I am usually tempted to reply with the classic vaudeville line, "compared to what?" The salient point about expenses is that they should be compared to the corresponding benefits. A cost that produces scant benefit is too expensive; a cost that yields significant benefits is a bargain.

The purpose of the PLTL expenditures is to help students learn. The maximum cost of workshop learning is approximately \$100 per student per semester (this estimate includes leader stipends and leader training and staff support costs; local arrangements may reduce the costs). In the context of today's tuition of \$500 to \$3,000 per course, this does not seem like an unreasonable allocation of tuition income.

The other side of the analysis asks about the benefits to the students. There are no established metrics for analyzing the cost per unit of student learning. However, we can catch the spirit of the requisite analysis by dividing the cost per student by the average grade points earned. If all students learned at the A level (grade points = 4), then the cost per unit of learning is smaller than if the students learned at the C level (grade points = 2). If all the students dropped or failed (grade points = 0), the cost per unit of learning would be infinite. Since the PLTL Workshop increases student learning as measured by total exam points earned, average course grade and percent ABC, (see *J. Chem. Ed.*, 2003, 80,132-134), the new cost is justified by the learning gain. Using data from first semester Organic Chemistry at the University of Rochester, the investment in Workshops produced a 17.5% gain in total points earned and a 16.5% increase in percent ABC, respectively.

Two other kinds of benefits are important. The PLTL Workshop increases student satisfaction, as judged by attendance, student surveys and interviews. Ultimately, student success and satisfaction translate into increased revenue from tuition, alumni giving and public support. The other significant benefit is to the Workshop Leaders. Observers often note that the

Leaders get more out of the program than the students do. I usually downplay the remark because the PLTL Workshop is for the students. Nevertheless, there is truth to the statement. Leaders learn, *inter alia*, science, leadership, teamwork, communication, human relations, tolerance, professionalism, learning theory, problem-solving and metacognitive skills. Many Leaders tell us that they were transformed by the experience. Finally, I think that the lessons learned in Workshop by students and Leaders are lasting and transferable to other situations. If so, the units of learning continue to compound and the cost per unit of learning ultimately becomes infinitesimally small. *When the benefits are added up, the PLTL Workshop is a bargain.*

The expenditures for the PLTL Workshops are new costs to the institution and faculty members often wonder where they will find the money to support the PLTL initiative. The theoretical answer to this question is to find the parts of the institution that 1) have an agenda that overlaps with the PLTL goals and 2) have money. In practice, faculty and institutions have been marvelously creative in finding ways to fund PLTL. Local connections and insider information about institutional priorities are most helpful.

Sufficient data are available now from other institutions to show that PLTL Workshop is a workable and robust mechanism to help students learn. Although it may be necessary to show that PLTL will work on the specific campus, the demonstrated benefits should also be sufficient to win institutional support. Some approaches are obvious; for example, Deans, Provosts and Presidents often have funds to support teaching initiatives and reforms. Some less obvious, but equally successful approaches involve:

- pre-existing budgets to support tutorial or supplemental institution programs;

- institutional programs to establish learning communities;
- institutional programs to establish peer-mentor programs;
- science “lab fees;”
- work-study programs;
- direct alumni support;
- scholarship funds to support the development of specific groups of students; e.g. women in science, underrepresented minority students;
- Learning Center budgets.

My favorite fund-raising argument focuses on the Leaders. I like to think about their stipends as merit scholarship awards for their combination of academic accomplishment and leadership skills. It is an honor to be chosen to be a Workshop Leader. The stipend is tangible recognition of that honor. In that sense, the stipend is not a cost, but a reward to some of our very best students.

*Jack Kampmeier*

**COST OF PLTL WORKSHOP**

<u>Cost</u> = \$100	<u>Cost</u> = ?
<b>Student</b>	<b>Learning</b>
$\frac{\$100}{\text{(grade) } 4.0} = \$25$	$\frac{\$100}{2.0} = \$50$ $\frac{\$100}{0.0} = \infty$

**BENEFITS OF PLTL WORKSHOP**

<u>\$100</u> ⇒ Student	19% Increase in Average Grade
<u>\$100</u> ⇒ Student	20% Increase in % Success
Increase in ↑ <u>Student Satisfaction</u> And Retention	= TUITION ↑ ALUMNI GIVING ↑ STATE ALLOCATION ↑ and REVENUE LOSS ↓
<u>Leaders:</u>	UNDERSTANDING ↑ LEADERSHIP SKILLS ↑ COMMUNICATION SKILLS ↑ TEAMWORK SKILLS ↑ CONFIDENCE ↑

## THE SIGNIFICANCE OF SUPPORT

Although professors are free to select much of what constitutes a course—textbooks, material and format for tests, lecturing methods, etc.—introducing workshops requires approval, funding, and logistical support from another level, that of department chair, dean, and sometimes higher. When this support is strong, and the other components are in place, PLTL workshops stand a good chance of succeeding. When administrative support is weak, professors implementing the program feel they must struggle and beg for the necessities of implementation. Yet administrative support is not an all-or-nothing

affair. Most administrators are in favor of more creative approaches to teaching and learning and they support the introduction of workshops. They are sometimes not able or willing to make the extra effort needed to obtain funding or fit workshops into the program of studies. It is often the case that the success or failure of PLTL is found in the details.

*Leo Gafney*

## FINDING FUNDING

*Students and professors have found the workshops to be vastly different from TA-led recitations, informal study groups, and tutorial sessions. Unless participants maintain a clear vision and commitment to the Workshop method, there is a danger that the program might regress to something more familiar and easier to maintain...but less effective than the workshops.*

When asked about barriers to implementation or to the institutionalization of PLTL, faculty mention a number of areas: the time and effort required to get started; recruiting, training, and supervising leaders; finding or preparing suitable materials; space and time arrangements; and funding. Funding refers primarily to the expense for paying workshop leaders. This article will briefly review ways in which to support workshop leaders for their roles in PLTL, including funding and non-funding rewards.

Jack Kampmeier made a very convincing case that a cost of \$100 per student per semester which includes both leader stipend and staff support has resulted in very large learning gains for students, and in personal/professional benefits for workshop leaders at the University of Rochester. Others have pointed to significant reductions in DWF numbers for PLTL courses. Jack points out that \$100 seems reasonable in the context of courses for which tuition ranges from \$500 to \$3000 per course. [In 2004] You may have noticed TV pictures of California students protesting the increase of tuition to \$26 a credit, that is \$78 for a three-credit course; Miami Dade Community College charges \$52 a credit, \$156 for a three-credit course. In these cases an additional \$100 per student is substantial, and even institutions with high tuitions are often unable or unwilling to provide funding for PLTL leaders.

So we need to consider a variety of possibilities. Jack mentions a number of funding alternatives for student leader stipends. This article picks up where he left off, exploring in greater detail options for providing student leader stipends or recruiting and supporting leaders without stipends.

**1. Leaders are not paid:** A number of institutions are recruiting leaders and not paying them. At these sites students receive course credit. Mike Shaw at Southern Illinois at Edwardsville (SIUE) and Chris Bauer at the University of New Hampshire use somewhat similar approaches. New leaders are not paid but may take an accompanying course for credit. After acting as a leader once, a student is paid if selected for a second leadership experience. At SI-

UE, these experienced leaders may participate in a no-credit program that provides a transcript commendation noting leadership experience in chemistry. At UNH, some students opt for payment for workshops, but receive another credit for weekly consultation about their work.

Similarly, at Portland State and the University of Miami leaders are not paid, but may receive credit. At Boston University students receive two credits of undergraduate research credit per semester. Mort Hoffman reports that BU is instituting a two-credit course, titled, "Chemistry Education Practicum." Students there are very satisfied and like the idea of a rather easy A that will help them maintain a high GPA.

**2. Grants:** Funding from grants, particularly for curriculum innovation, has been helpful to PLTL leader funding in several ways. Miami-Dade Community College has a Title V grant as a minority-serving institution, "Creating a Culture of Academic Success in Math, Science and Engineering." This pays peer leaders for several courses that have been identified as critical regarding the objective. The University of Houston Downtown, Prince George's Community College and others have attached PLTL to NSF and other grants. This funding may work in various ways. First, the grant may explicitly include PLTL as teaching/learning initiative and make funds available. Second, some grants do not allow for student stipends, but paying for faculty time may free up money from instructional budget lines that can be transferred to student leaders.

**3. Internal Soft Money:** A number of sites report that they receive funding, "from the dean." Another form of internal funding exists at Western Oregon where budget cuts have reduced available resources. Several of the biology professors chip in to a fund that pays leaders on an hourly basis. This is not an approach that they hope to institutionalize.

**4. Internal Fees:** Alan Berkey, dean at Miami Dade Community College reports that even non lab courses have a lab fee of \$10 to \$15 and this can be used to pay some of the peer leaders.

**5. Work-study:** Several sites including the



University of Portland have reported using the work-study program to fund at least some leaders. The program is in place at virtually all colleges and may well be worth investigating, although there are economic qualifications and restrictions on the use of funds.

**6. Academic Assistance Centers:** These centers offering academic support are active at many institutions, and are growing. At a number of PLTL sites personnel from these centers assist in the training of leaders and even provide funding for leader stipends.

**7. System-Wide Initiatives:** A few years ago the Indiana system put through a tuition increase. The money raised is used to encourage learning initiatives. David Malik from Indiana University Purdue University Indianapolis (IUPUI) wrote a grant titled Student-to-Student Scholars, S<sup>3</sup>: Academic and Educational Success via Student Engagement with other Students. The project has been funded. PLTL is a key component but the project also includes assistance centers and service learning.

**8 Institutional budget line:** Coastal Carolina University, Ohio University, Athens, the University of Rochester, and some others seem

to have permanent institutional funding. This is probably the ultimate goal, but as we have seen there are many possibilities.

Providing course credit rather than a stipend for leaders has been adopted by a number of public and private four-year institutions, but it does not appear to be the practice at community colleges at all. There are several reasons for this. First, community college students are concerned about credits that they can transfer to a four-year institution. Second, community colleges may have difficulty waiving tuition. Third, community college students generally need the stipend and would work outside of school without it.

As mentioned at the outset, funding is frequently mentioned as a problem and possible reason for discontinuing workshops. But there are many sources of funding PLTL programs and of providing for peer leader stipends. We hope that the above may stimulate thinking and lead to ideas for funding, or for some other form of support and recognition for leaders.

*Leo Gafney*

*Growing a PLTL program by supporting faculty?*

*See Florida International University's example in Biological Sciences in Jose Alberte and colleagues' paper in the 2013 Conference Proceedings:*

*Training and Supervision at [www.pltlis.org](http://www.pltlis.org)*

*Participants from Florida International University at the 2015 PLTLIS Conference, University of Texas at Dallas, creating a schematic of their PLTL program*



## FINDING ALLIES ON CAMPUS...

### LOCATING THE ELUSIVE LEARNING SPECIALIST

*Your learning assistance center. comes under a variety of titles, i.e., academic support center, academic enhancement center, teaching and learning center, to name a few. If you don't have a center find the office or unit that provides tutoring services of some kind. Most campus tutoring programs provide some type of training for their staff. This is a ready-made resource for PLTL training.*

How can faculty find “learning specialists” on their campus to help them with the training of leaders, and possibly the dissemination of the Peer-Led Team Learning (PLTL) Model? The best approach to this topic is to relay how I was found. A chemistry faculty member who had participated in a summer Chautauqua<sup>1</sup> course on PLTL approached me, the Assistant Dean of Students and Director of the Learning Assistance Center. He scheduled an appointment and we met in my office. During that meeting he outlined the model and asked if my office could help in any way. In retrospect, that was a very smart approach. I was first struck by the fact that this faculty member was initiating contact with my office. Typically it is the other way around. Secondly, he didn't tell me what he wanted me to do. Instead, he gave me an overview of the program and asked me if I thought it complemented the mission and goals of my office, and if we could support his effort in any way. He was diplomatic and charming in his presentation. I was baited and hooked! Since that initial meeting we have worked together for over four years. I helped him raise money in support of the program and my office adapted and teaches a section of its tutor-training course to train peer leaders. We have presented together at national conferences and meetings; we are the co-authors of a chapter<sup>2</sup> on PLTL, and we co-facilitated a Chautauqua short course on PLTL. I can honestly say we have a true partnership.

My story sounds easy enough to replicate, but many faculty have indicated that they are unaware of comparable services on their campuses. How do you find the elusive learning specialists on your campus? First, the title, “learning specialist,” is a generic term. You will probably not find a person with that title on your campus. Because many of us wear so many different hats and we come in many different forms on college campuses, the PLTL leadership created a term to encompass us all. One sure place to find a learning specialist is in your learning assistance center. It, too, comes under a variety of titles, i.e., academic support center, academic en-

hancement center, teaching and learning center, to name a few. If you don't have a center find the office or unit that provides tutoring services of some kind. Most campus tutoring programs provide some type of training for their staff. This is a ready-made resource for PLTL training. If you don't have this type of academic support program, another resource for training assistance could come from your residence life program. Residence life has a long history of hiring and training students to serve in various capacities. This is a rich source to tap for cross training especially in some of the soft skills, i.e., communication, working in groups, diversity, campus resources, etc. Another resource that can support leader training is your campus leadership programs. This is a growing area of interest in co-curricular programming. Some schools have established leadership programs and centers. Again, student training is central to these programs. The key here is identifying sources on your campuses that hire large numbers of students, i.e., peer educators, peer advisors, etc. Inevitably, training is a part of their hiring practice. You may want to start by looking at your campus web pages. I found this to be a useful exercise.

Once you have identified some possible resources, the challenge will be in persuading that unit to support your effort. In many instances, it will simply be a matter of asking for help. Many of these resources fall under the category of student affairs. Most divisions of student affairs welcome opportunities to form partnerships with faculty. On my own campus, the Vice President of Student Affairs places a premium on collaboration efforts. Her goal is to create a seamless web between academic and student affairs. The PLTL model complements this goal in many ways. But I am not naïve enough to assume that this is the case on every campus. There are political implications depending on the climate and culture of your campus. The approach described above that was taken with me worked like a charm. I suggest you do a little homework on your own campus to gauge who and what your resources are, to understand what they do and how they work, and to ask for their help.

There is a saying that if you want something done right, you better do it yourself. I think we have all experienced this at some time. Finding allies for implementation and on-going support for PLTL may be challenging. And it may feel easier if you go it alone, but the rewards of cross-campus collaboration far outweigh the effort. Collaborating with learning specialists on your campus models the philosophy of the Workshop Project. Workshop is a team effort and the learning specialist is an essential component of the team.

*Linda Dixon*

### References

<sup>1</sup>Chautauqua courses were sponsored by the National Science Foundation (<http://www.engr.pitt.edu/chautauqua/>), focused on professional development.

<sup>2</sup>Sarquis, J., Dixon, L.J., Gosser, D.K., Kampmeier, J.A., Roth, V., Strozak, V.S., Varma-Nelson, P. (2001). Chapter 26: The Workshop Project: Peer-Led Team Learning in Chemistry. In Miller, J.E., Groccia, J.E., Miller, M.S. (Eds.). *Student-Assisted Teaching: A Guide to Faculty-Student Teamwork*. Bolton, MA: Anker Publishing Co.

## WHAT PLTL MEANS TO ME!

Becoming a Peer Leader introduced me to my research professor. PLTL molded my leadership skills, which carried over to my classes, research, and workshops. I now possess adequate leadership skills that will serve me well in my pursuit of becoming a chemistry professor.

Being comfortable with being uncomfortable

Practice makes perfect! – Future High School Math Teacher

PLTL creates Leaders

Learning for the sake of learning, not just for the right answer

PLTL is a passion and inspiration to me every day

Leading has opened many doors for me, especially socially. It has helped me develop and grow as a person

PLTL means community, students giving service, forming a bond, friendship, and hopefully success in the course

Opportunity for students (the peer leaders) to create a relationship with faculty

An opportunity to help students with obstacles that I struggled with when I was in their position

*- Participants at the 2013 PLTLIS Annual Conference*

## PLTL FROM THE ADMINISTRATOR'S VIEWPOINT

*We now have ample evidence that student performance and retention do improve with Peer-Led Team Learning. Administrators generally find these data persuasive.*

*PLTL can have a bridge-building and bonding effect. Administrators repeatedly stressed an area that has not generally been mentioned as central to PLTL, namely the various ways in which the program can create new connections and bonds.*

Successful implementation of Peer-Led Team Learning requires the support of an institution's administration. As part of the ongoing PLTL evaluation, data was gathered on such support, and the dynamics of how administrators view PLTL were explored.

Phone interviews were conducted with deans, provosts, and college presidents at institutions where PLTL is thriving. We investigated administrators' views about PLTL and how this [National Dissemination] Project fits into their vision of teaching and learning, curriculum reform, and the mission of their institutions.

Twelve interviews were conducted with administrators from ten institutions. These included three community colleges, four liberal arts four-year colleges, and three four-year state-run institutions. Interviews averaged 25 minutes in length, were recorded, transcribed, and analyzed. This sample was not large enough to provide statistical data but a number of themes emerged. Five of these will be discussed.

1. *A fit with local priorities and previous experiences can give PLTL an opportunity and good start.* Administrators were asked whether there were institutional priorities that provided an environment suitable for Peer-Led Team Learning. In response, almost all of those interviewed reported teaching/learning and curriculum activities that preceded and in some cases previewed the adoption of PLTL.

At Portland State (OR), the Freshman University Studies Program groups 30 to 40 students with a peer mentor. These mentors meet regularly with students; work with them on computer, library, and other skills. They are generally seniors and are paid. The administrator interviewed had participated in this program, and its success in using peer leaders disposed him to see the benefits of PLTL.

The University of Portland (OR), Coastal Carolina (SC), Goucher (MD), and others had been experimenting with new pedagogies. In several cases, faculty had taken sabbaticals to investigate promising

new programs. The knowledge, energy, and innovative spirit of these faculty members impressed administrators who were then ready to endorse PLTL.

It is a truism that evidence of improved student performance and retention is a priority for deans, provosts, and presidents. They want to see success. But many new programs, even those that are genuinely beneficial, find it difficult to produce convincing data. Innovative curricula often propose new goals and consequently outcomes cannot be compared with those of traditional approaches. PLTL, however, has proposed that student performance can and should improve as measured by traditional class tests, whatever these might include. We now have ample evidence that student performance and retention do improve. Administrators generally find these data persuasive.

Deans and presidents are often invited to special PLTL activities, e.g., demonstration workshops, poster sessions and the like. In interviews they indicated that they were impressed with the poise of student leaders whom they see as ambassadors in recruiting.

2. *The introduction of PLTL at an institution requires administrative support in rewarding peer leaders, generally but not always through funding in the range of \$500 per workshop, per semester.* In terms of a university's budget this may be a small amount, but as new money it generally presents a genuine issue. The administrators interviewed were selected because they were at institutions supporting PLTL. They recounted a variety of successful strategies for funding.

Existing funds such as institutional support for tutors, learning centers, work-study and student service activities are sometimes redirected toward PLTL.

State funds for designated curriculum initiatives, as in California, can be directed toward PLTL. These funds are expected to recur and to provide a reasonably secure base for PLTL.

Financial support for PLTL is sometimes included in other grants such as the National Science Foundation (NSF), Alliance for Minority Participation (AMP), the College Curriculum and Laboratory Initiative (CCLI), Health and Human Services (HHS), programs, and the Fund for the Improvement of Post-Secondary Education (FIPSE). These programs may have a primary objective related to minority students, active learning, teacher preparation, or some other area. But they include PLTL as integral to the attainment of the project goals.

At one institution, PLTL time has been included under the Full Time Equivalent (FTE) student course load that determines funding. This would seem to apply only to publicly funded schools that operate according to a particular formula.

Deans and presidents often have access to special funds of one kind or another that they may direct toward PLTL.

A number of institutions are experimenting with approaches that support peer leaders without funding.

Students are not paid the first time they serve as leaders, but only the second time.

Students receive credit for attending the weekly workshop preparation sessions and for their work as leaders. This is different from arrangements in which students are paid for workshop activities and receive credits for a separate pedagogy course.

3. *Local dissemination and institutionalization go hand in hand.* The very same activities that contribute to successful dissemination are also steps toward institutionalization. Administrators noted the following stages at sites where PLTL has been successfully introduced and has gained momentum.

PLTL information flows informally among faculty. This flow seems to be more effective when faculties are smaller; there is physical proximity among offices; working connections already exist among faculty members and departments; there is a serious interest in teaching and learning.

Successful workshops produce satisfied students who recognize what PLTL has done for them, and talk about it. Faculty members listen to them. Administrators report that they became aware of PLTL's successes, both formally and informally, through the institution's communications networks.

Following initial workshop success, faculty members present the method, their experiences, and findings at local meetings, on campus or at regional conferences. Administrators are influenced and involved because they want to see improved student performance and faculty interest in pedagogy. They work to secure funding.

So dissemination across a site tends to get people involved; address pedagogical issues; create compensa-

tion ideas and find funds; make PLTL part of the way things are done. These are important steps toward institutionalization.

4. *PLTL can have a bridge-building and bonding effect.* Administrators repeatedly stressed an area that has not generally been mentioned as central to PLTL, namely the various ways in which the program can create new connections and bonds.

Bonding among students. Community colleges and urban commuter school administrators reported that PLTL can help bring students together for academic work in ways that will carry over to other courses. They begin to see the institution as a location for informal learning, not only for attending lectures.

Future teacher connection and bridge-building with schools of Education. There is general agreement that workshop leadership provides an excellent experience for students with a real or potential interest in teaching. Workshops fit very well with contemporary approaches to teaching and learning, and can motivate students toward secondary school science teaching.

Bridge-building across departments. When there are common interests in teaching and learning, PLTL can provide a focus for discussion and an area of program agreement.

5. *There are certain common elements that administrators would like to see in PLTL proposals.* The final question of each phone interview asked administrators what they would like to see in a proposal to fund a PLTL program. The following are some of the more important elements suggested:

- a clear description of the program, its distinguishing characteristics, and how it differs from other programs;
- evidence of improved student performance;
- a link to retention and recruiting;
- description of a structured program to guide peer leaders;
- a commitment from faculty to direct, manage, and evaluate the program;
- a description of PLTL's benefits to peer leaders;
- evidence of collegiality and bridge building.

*Leo Gafney*

## WHEN THE MONEY DRIES UP: WHAT'S A DEAN TO DO? HOW YOU CAN HELP YOUR DEAN HELP YOU

As Dean of Arts and Sciences at a public university, I experience daily the consequences of declining public support for public education. Public funding has been cut while the number of students we serve has increased. We are all increasingly tuition dependent, but tuition pays just a fraction of the costs of an education. My colleagues at private institutions fare no better; for many, their primary source of income is from tuition; they spend hours of their time ensuring that they will successfully recruit the next crop of first year students on which their budgets depend, and hours more raising funds from outside sources. In short, the budget crisis is real, and we are constantly being asked to defer, to cut, and to prioritize.

The irony is that every dean was once a faculty member, with the same strong commitment to teaching, scholarship, and service that every academic has. In fact, in talking with my decanal colleagues, I have discovered that most deans decide to move into administration because they want to be able to have a helpful impact on the academic lives of faculty and students, and to make a mark on the institution. That said, sooner or later, the external funds for PLTL will dry up. The initial response of every dean is very predictable (with apologies to Elisabeth Kubler-Ross):

- Denial: "The money will never end! We'll just apply for an extension."
- Anger: "How do you expect me to pay for this?"
- Bargaining: "If I do this, will you....?"
- Acceptance: "Well, of course we have PLTL. Doesn't everybody?"

The ultimate goal is institutionalization, that is, we want to bind Peer Led Team Learning so into the culture of the University that it becomes the norm, and its model of teaching is seen as business as usual. What does PLTL mean to a Dean?

From a Dean's perspective, the value of PLTL is directly related to its success in meeting mission-related institutional goals. That is, after all, how our university is judged by accrediting bodies and legislators: Do we do what we say we are doing? The following will help you help me help you ensure the long term success of PLTL at our university.

*How does PLTL express the mission of the University and the College?*

For example, our mission is access and excellence. We provide a high quality education to the most diverse student body in the Midwest. So, you tell me about how PLTL uses cooperative learning as well as the more social and verbal learning styles that characterize many female and diverse learners. This

means that we have more female and ethnic minority students who are successful in College level math and science and who become majors and later professionals in disciplines that are not usually seen as friendly to them.

*Give me the data!* Too often assessment data goes to the NSF or some other outside agency and I never see it. But I am the one who needs to know, for example, that you have improved retention and graduation rates among students of color, and I am the one who will have to defend the program to University Budget Committees, Provosts, and even Trustees.

*Show me a plan.* My budget may have been made up eight months ago, and you are telling me NOW that I need to provide \$5000 for student stipends? Talk to me a year before the funding ends. Show me where else there might be funds available. Is there money for tutors? Can you handle larger lectures with Peer Leaders in place? I need to be able to offset funds against each other, because it is very unlikely my budget will show an increase next year.

*Show me academic transferability.* I am impressed by your success in your discipline. Can I get the same improvement in graduation and retention rates in Math? Biology? More women who are successful in Computer Science?

*Can I call this faculty development?* I may have access to funds that are not part of my instructional budget. You know how this has rejuvenated your own teaching. Help me help others rediscover that same excitement.

*Help me find "in kind" tradeoffs.* While the net cost may be the same, the funds may come from different areas, or (from my perspective, even better) from someone else's budget. Can we give students course credit instead of stipends? Tuition waivers? Dedicate a scholarship fund? How can I adjust faculty workloads appropriately?

Finally, one should never assume that a lack of cash support means that I do not support this (or any other) innovative teaching method. I am, after all, a teacher and scholar first. I believe in education and I care about students and faculty. But you have to help me see how I can do it. Bring me to acceptance.

Kate Forhan

## A TREMENDOUS UNTAPPED RESOURCE

Peer-Led Team Learning (PLTL) is a model of instruction that was first introduced in general chemistry classes at The City College of New York (CCNY), part of the City University of New York (CUNY) system. In the early 1990's, CCNY introduced formally scheduled student-led workshops that were an integral part of the course. The first group of leaders was recruited from advanced chemistry students. Thereafter, it was found that new leaders could be recruited from those who had done well in the class, had good communication skills, and a desire to assist other students: they could become leaders in the following semester. The weekly structure was fairly simple: student leaders prepared for workshops by discussing the material with the faculty teaching the course. Following the preparation, the leaders would meet with their group to lead a discussion and debate of chemistry concepts and problems. This model then expanded to other colleges in the CUNY system.

Our first observations were of an unforeseen explosion of enthusiasm for these peer-led workshops. In focus groups, students and students leaders voiced support for the model. In contrast to lecture where students "might not say anything the whole semester," students felt that workshops reduced anxiety, leaders were accessible, and peers became supportive. The leader was viewed as a peer, sometimes a friend. It was frequently remarked that the leader explained things "in a different way...using different vocabulary and examples." Leaders were successful because they were close in age and "know where you are coming from" and "the way you understand things." There was agreement that in all groups, students started out feeling and acting alone, bringing with them their traditional classroom attitudes, but after a few weeks behaviors changed. Workshop leaders asked their students to explain problems, and as these students became increasingly confident, they in turn began questioning and helping one another. They found it beneficial that the same idea would often be expressed in different ways by different students. The importance of mistakes came up. The workshops provided students "the chance to make a lot of little mistakes," helping to "make connections in the brain." Students regarded their peer leaders as less threatening than their professors, so they felt free to express themselves and explore different ideas, to see where they led, "to see what worked."

This workshop model was further developed and refined by a group from the University of Rochester, New York City College of Technology (CUNY), and St. Xavier University, Chicago. Areas of substantial effort by this group included the development of leader training and materials, institutional issues, and evaluation of the model. This group expanded further and by 1999 the

core dissemination group now included the University of Montana, Prince George's Community College (MD), the University of Miami (FL), San Jose City College (CA), Glendale Community College (CA), and Portland State University (OR). The project grew beyond chemistry and by June 2002 had grown to include a diverse group of over 135 faculty and 1400 peer leaders per semester who are conducting PLTL workshop courses in biology, chemistry, mathematics, and physics for 15,000 students at 55 colleges in 25 states.

The PLTL model was refined by a team of science and mathematics faculty and learning specialists from a diverse group of campuses. While it may be said that the concept of using more advanced peers to lead small group learning is not entirely original, it has not, until recently, really been formally recognized as a pedagogical model. It may reflect the student interactions that may have taken place in "the little red schoolhouse" where necessity required more advanced students to assist others; it also reflects the work of such pioneers of innovative teaching represented by small group learning promoted by Uri Treisman and the Keller plan. However, by carefully defining PLTL it becomes amenable to study, accessible to employ, and easier to maintain and institutionalize. It certainly shares many features of active student engagement with various models of student assisted learning. The unique feature of PLTL is the specific role of a student (peer) as a leader of the group discussion. We believe that the PLTL model retains the advantages of small group learning, but introduces several important qualities that make team learning more accessible by utilizing a tremendous untapped resource of the college, undergraduate students.

David Gosser

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## INTERVIEW WITH A PEER LEADER

*Shela Rote was interviewed when she was a senior at the University of Miami, Ohio, with a double major in pre-med and sociology. In the Fall 1999 term she was a workshop leader a second time. She was interviewed in September 1999 by Leo Gafney.*

Leo: Tell me a little about the workshop arrangements—the group size, how long you meet, and things like that.

Shela: Last year there were four in my group. We met in a study room in the library. This year I have eight and we meet in an actual classroom. So that's a little different. It's actually better. Since there are more, there is a little more accountability. With four, if one is missing it's like you're just having this little chat. But I think eight is about the limit.

Leo: What kind of training do the leaders have at the start of the year?

Shela: We are taking a course through the Education Department. Last year we did a similar course for tutoring. We had an orientation and met once a week for two hours and discussed things that work and don't work and how to get people motivated. This year we will meet on Saturday and discuss things like study skills and how to help students be more effective in learning chemistry.

Leo: What kinds of materials do you use?

Shela: I'm a little different, because I really get into this. I'll bring a model kit, or cut out different things from construction paper. We do skits. Like I'll get them (students) to pretend they're molecules. It's really silly, but they get into it, and they're never going to forget how hydrogen bonding works. We're learning stoichiometry this week and I'm bringing different kinds of candy to work on different kinds of groups. Anything to try to make it more like real life.

Leo: What got you going this way?

Shela: Chemistry was really hard for me as a high school student and I did pretty poorly. So it is amazing that I have the major that I do. But I was frustrated and didn't enjoy it at all. So I came to college with a really bad attitude, and didn't really want to take the class that was required to go to medical school. But I was taking it and Dr. Sarquis started doing all these experiments in class and so that kind of got me started thinking, 'Wow this is real; this is cool.' So I started looking for ways to make it interesting. And then I started to really like it. I did a total 180 and began to love it. Then I would look for any way to make it more fun.

Leo: So the workshop was a great opportunity.

Shela: Yes, it really was. And I think maybe I am a little more compassionate than someone for whom chemistry comes easily. I know how hard it is. I think that a big part of the workshop is the discussion, like, 'Boy, I had to work four hours trying to figure this out.' Because people think they are alone. So it is important to get students to understand the importance of group work.

Leo: Any other benefits to students?

Shela: One of the things that they get really frustrated about, but that is a big part of the program, is that there aren't any answers. It really is like real life. If any of these people are planning to do research, or even just work in a real job—there aren't any answers.

Leo: Do you meet regularly with Dr. Sarquis?

Shela: He meets with us once a week and he tries to let us go through it as a group, but he is right there in the room with us and he will say, "This is how you might want to approach this," to be sure we are on the right track.

Leo: Do the students get the sense that the professor wants them to be involved and that the workshops are important?

Shela: Definitely. I walked in this year and they had the self-test started. They were already excited and motivated, and felt like the workshop was important. It's because he built it up to be important. A lot of things that I was prepared to tell them, I didn't really have to say. Dr. Sarquis had already explained it. They wanted to stay late to do some problems.

Leo: How about yourself? What benefits do you feel you have gained from the workshops?

Shela: Originally I got involved because I am planning to teach later on in my career, and I wanted to find out something about what works and what doesn't in discussions and things like that.

Leo: Do you feel you have achieved some of that?

Shela: I think I have. I'm a big organizer, but I have found that sometimes I have to realize that the way the group turns the discussion is probably better than what I had planned. I really listen to them. And the more I listen to why they don't understand something the easier it is for me to make the next workshop more applicable to their needs and where they are coming from.

Leo: It sounds as if there are a lot of benefits to students beyond learning chemistry, such as learning to listen.

Shela: Yes, it is preparing them for their future education. Real education is not about listening to a big lecture. It's about discussing things with just anyone. It makes me hopeful that they will get some discussions



## STRAIGHT DOWN THE RIVER: RAFTING AND THE WORKSHOP TEAM

*I once went on a rafting trip expecting a relaxing weekend with my friends. The experience that ensued was not what I had imagined. To begin, I was subjected to four hours of training, including how to carry the raft, paddling techniques, rescue maneuvers, and other non-essential things. I remember thinking why should I care, this truly doesn't affect me, for my raft mates will paddle, everyone will stay in the raft where they belong, and carrying the boat is for my river guide to worry about. The next morning when we set out for our adventure, I remember the guide saying, "My job is to keep you going straight down the river, and to coordinate your efforts for the benefit of all. Your job is to paddle your butt off when I tell you to, hold on when I tell you, and you will work like you have never worked before for the next two hours . . . I will make sure your work gets you where you need to be."*

*This is the very role we play as workshop leaders. It is not our job to do the work. It is our job to see that all workshop members contribute, and to ensure that the work of the workshop group produces results.*

going on their own. I told them on the first day, "This group is not just for meeting from two to four on Tuesday." I gave them all each other's phone numbers and told them to call each other . . . their professor is not the only person they can learn from.

Leo Gafney

Many students have the mindset that they do not have to prepare, for their workshop mates will do the work, and the workshop leader will come to their rescue when they struggle. This mindset was much like mine on my rafting trip: "Why should I care? Others will do the work and our leader will make sure we do everything right." This cannot be further from the truth. When one person does not do his or her part, the team suffers. It is this team suffering that makes people pull together to solve a problem and this is how people learn. This became apparent to me on that fateful rafting excursion. When the people in our raft did not work together, we found ourselves swimming through the grueling rapids rather than enjoying the rapids from the confines of our raft.

The greatest lessons learned in life are the lessons associated with a struggle. Human nature often fosters passively learning what we deem not important, and actively learning things that are important. Nothing facilitates active learning like a struggle, and it is not the leader's job to interfere with the struggle. If the leader steps in and solves the problem, the workshop students are robbed of a golden opportunity to learn not only a chemistry or biology lesson but also a lesson about life: hard work, perseverance, and teamwork can solve the most difficult of problems.

Chad Edwards

*The poise and confidence that the leaders exhibited while presenting their views to sometimes skeptical faculty quickly and easily convinced us that students could indeed be partners beyond what we had initially imagined.*

*Human nature often fosters passively learning what we deem not important, and actively learning things that are important. Nothing facilitates active learning like a struggle, and it is not the leader's job to interfere with the struggle.*

*Real education is not about listening to a big lecture. It's about discussing things with just anyone.*

*Vygotsky's theories of education are a great place to start to gain an understanding of the theoretical underpinnings of Peer-Led Team Learning.*

*...“more capable peers,” or workshop leaders in the PLTL model, can be used to promote learning within the ZPD.*

## VYGOTSKY'S ZONE OF PROXIMAL DEVELOPMENT: A THEORY BASE FOR PEER-LED TEAM LEARNING

Imagine science without theory. We would have nothing but a slew of empirical data with no framework upon which to make sense of our observations. Some progress would be made toward understanding the universe and learning how to exert control over the natural world, but it certainly would not be as dynamic and efficient as with theory-driven science. In fact, it is probably not possible for the human mind to merely accept scientific data without attempting to theorize about the underlying causes of the phenomena.

Now consider teaching. Is teaching scientific in that it is theory driven or is it largely an empirical process? For many, teaching certainly is an empirical process. We begin our teaching careers by teaching as we were taught, with changes along the way as we experiment with various techniques.

What if teaching could be changed so that there is a theory base behind our actions, where theory and experiment mix together to form a science of teaching? Could this improve the quality of teaching? I, for one, believe the answer is yes. And I am not the only one who advocates a scientific approach to teaching, as there is a small but growing community of science educators who are attempting to develop curricula by following theory and theory-driven experiments. Theories about how students learn should be curriculum drivers. Vygotsky's theories of education are a great place to start to gain an understanding of the theoretical underpinnings of Peer-Led Team Learning (PLTL).

Lev Vygotsky (1896-1934), born in Byelorussia, was a psychologist who lived during the Marxist era of the former Soviet Union. His works were not known in the West until the 1962 publication of his book *Thought and Language*. It is very interesting that Vygotsky was a critic of Piaget, given that Piaget's works have had the greatest influence of any psychologist over chemical educators. Nonetheless, both Vygotsky and Piaget were constructivists, and both theories can be used to understand student learning.

The most important concept from Vygotsky's works, as applied to PLTL, is the *zone of proximal development*, or ZPD. Vygotsky defined this concept as “the distance be-

tween the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.” The lower end of the ZPD is defined by what the student is capable of doing independently. This is what would be measured by a classic IQ test. The high end of the ZPD reflects what a student can do when given hints and guidance during the problem-solving process. With the ZPD concept, Vygotsky puts forth a new way of viewing intelligence. Instead of a static point, it is a range where the traditional view of intelligence defines the low end of the zone. Vygotsky believed that the width of a student's ZPD is a better predictor of potential for success in school than is traditional IQ.

Problems above the upper end of a student's ZPD cannot be solved, even with assistance. Problems at the lower end can be solved independently. Thus, problems within a student's ZPD are those more difficult than those that can be solved at a student's present level of development, but can be solved with help. As a student learns to solve such problems, the lower end of their ZPD is redefined at a higher level, and the student grows. It is therefore imperative to work within a student's ZPD. This represents our overarching goal in the peer-led team learning model: peer leaders help students to work within their ZPD.

Classroom time in traditional curricular models rarely is used to challenge students to work in any fashion, let alone within her/his ZPD. Much of it is passive notetaking and listening to others solve problems. The PLTL model restructures this time so that some of it is spent in the optimal learning setting, as defined by Vygotsky. It is important to note that Vygotsky specifically stated that “more capable peers,” or workshop leaders in the PLTL model, can be used to promote learning within the ZPD.

*Mark S. Cracolice*

## THE ANSWER KEY

*A college advisor sits at a desk in an office, looking at an open book. Students are crowding in the hallway by the advisor's office, waiting their turn. First student speaks to the audience.*

AI

Confused! I am so confused!!! What do I do? Where do I go? I was thinking about going into education, or maybe something like psychology, or sociology. I really like working with people, but at the same time I am really unsure of the opportunities out there. I wish that some one could just give me some answers! I wish there were an answer key, like an answer key to life!

Advisor

Next!

AI

*(Entering office)* Hello. Good morning.

Advisor

Hello. Hi, may I have your name?

AI

AI Drivers.

Advisor

How are you doing? Today, as you may know, is the last day to declare majors, so have you put any thought into what you want to do?

AI

Well, I was thinking about something along the lines of education, psychology, and sociology. See, I like working with people.

Advisor

Well, that's interesting, because in our answer key here, we have you down as a nuclear physicist.

AI

A NUCLEAR PHYSICIST! I hardly took any science classes.

Advisor

Well, you're about to start now. Next!

*(AI walks out of the advisor's office bewildered. Vic wanders in aimlessly, staring at the ceiling.)*

Advisor

Hi, may I have your name?

Vic

My name?

Advisor

Yes, your name.

Vic

Oh! The name is Prozac, Vic Prozac.

Advisor

Are you ready to declare your major?

Vic

I am clueless about what I want to do, but I really want to carry on the family tradition.

Advisor

What family tradition?

Vic

Dad did Chemistry, Mom was into Biology, while Uncle Bob was into Sociology, Aunt Gertrude, she was into History, and Cousin Joe did Philosophy. I'll pretty much do anything that ends with "Y".

Advisor

I guess you are in luck. I have you down for pottery.

Vic

Pottery... Sure, that works for me! *(Vic happily leaves the office.)*

Advisor

Next! *(Cher walks in.)* Good morning! Name please.

Cher

Cher, Cher Rice.

Advisor

Okay, Cher. Would you like to tell me what you have been thinking about your major before I tell you the answer?

Cher

I decided that I would like to be a rock star! You know, sex, drugs, and rock 'n roll!

Advisor

Oh. Your major is going to be a little different than that. I have you down for Theology.

Cher

Theology?!? Oh, God!

Advisor

Oh God? That's a good start! Next!

*(Cher, looking shocked, leaves, as Bob walks in.)*

Advisor

Good morning. Could I have your name please?

Bob

Yes. My name is Buoy, Bob N. Buoy.

Advisor

As you know, today is the day to declare your major. Would you like me to tell you the answer?

		<i>(David walks out and joins the other students who are milling outside of the advisor's office)</i>
	Bob	Cher
Okay.		Hey David. What's your major going to be?
	Advisor	David
You are going into Oceanography.		WHAT?
	Bob	Cher
Oceanography? But I can't swim!		WHAT'S YOUR MAJOR?
	Advisor	David
Well, maybe you can use some arm floaties. Next!		RENAISSANCE MUSIC HISTORY.
<i>(Bob leaves, frustrated) Next! (Pause) NEXT!</i>		Cher
<i>(Outside the office)</i>		Then teach us a song.
	Lacy	David
<i>(To David) You are next!</i>		Well, I only know one.
	David	Cher
What? Oh, I'm NEXT! <i>(David walks into the advisor's office.)</i>		OK, go ahead.
	Advisor	David
Hello. How are you today?		<i>(Sings to the tune of "Gary, Indiana," from The Music Man) Coastal Carolina, Coastal Carolina, Coastal Carolina, Coastal Carolina...</i>
	David	
<i>(Straining to hear) WHAT?</i>		All the students
	Advisor	<i>(In unison) U!</i>
<i>(Loudly) HOW ARE YOU?</i>		Advisor
	David	Next!
OH, GOOD.		Lacy
	Advisor	Good morning.
<i>(Loudly) What's your name?</i>		Advisor
	David	Good morning. Name please.
DAVID, DAVID GUESSER.		Lacy
	Advisor	My name is Lacy Garment.
Have you decided on a major?		Advisor
	David	<i>(Pauses) ...Lacy... Garment. Is that with a G?</i>
WHAT?		Lacy
	Advisor	Yes, Garment with a G.
HAVE YOU DECIDED ON A MAJOR?		Advisor
	David	<i>(Pauses) I do not see you on my list. Are you sure you go to school here?</i>
NO.		Lacy
	Advisor	Yes.
Well, your major is going to be Renaissance Music History.		Advisor
	David	This has never happened to me before, but I can't find your name on my list. Would you mind stepping out while I make a phone call?
WHAT?		Lacy
	Advisor	
RENAISSANCE MUSIC HISTORY!		
	David	
OKAY.		

Okay. *(She joins the other students in the hall.)*

Cher  
So what did you get, Lacy?

Lacy  
I wasn't on the list so I guess I don't have a major yet.

David  
WHAT?

Bob  
SHE DOESN'T HAVE A MAJOR YET!

Lacy  
Before I went in there, I was thinking....

David  
YOU WERE THINKING?!?

Al  
What have you been thinking?

David  
Wow, you think.

Lacy  
Yes, I have been thinking. I've always done well in math and science and I think discovering things is really interesting.

David  
Well, maybe you should go into chemistry. There is plenty to discover there.

Vic  
Wow, that would be great if you can work this out yourself.

Cher  
Yeah. I think I'd really like to go into chemistry. Guys, thanks for helping me figure it out.

Advisor  
Ms. Garment? Could you come back in here?

Lacy  
(Re-enters office.) Hello.

Advisor  
I just found out that whenever a student is not on

my list I can just write their name in. I was not aware of this option, but you can actually choose your major. Did you have any ideas about what your major should be?

Lacy  
I was thinking about some of my strengths with my friends and we all agreed that I would make a good chemistry major.

Advisor  
I will write in chemistry for you.

Lacy  
Thank you so much! I'm so excited.

Advisor  
You are the happiest person I have seen the whole day.

With thanks to (*In order of appearance*):

Deb Boehmler (University of Rochester) as *Advisor*

Elina Yusufova (City College of New York) as *Al Drivers*

Okason Morrison (City College of New York) as *Vic Prozak-*

Susan Hughes (State University of West Georgia) as *Cher Rice*

Scott Tinney (State University of West Georgia) as *Bob N. Buoy*

Chad Edwards (State University of West Georgia) as *David Guesser*

Sara Hoying (Miami University of Ohio) as *Lacy Garment*

*Background Note:*

This skit was an impromptu creation of some of the Peer Leaders at the Goucher Conference [2001]. Asked by David Gosser to make a presentation relating the issue of answer keys to PLTL and life in general, we opted to portray students who fear the thought process involved in learning and prefer answers be given to them.

The leaders discussed several ways of presenting and efficiently conveying the message. After agreeing on a skit we decided on names for the characters. Bob Blake, who wandered in briefly, suggested the idea of using the names of faculty members, only with a comical twist. Amid the laughter associated with practicing our lines, we traded ideas and workshop experiences we had on our different campuses of why answer keys were not necessary. Though we might not have taken an acting class, we provided a bit of comedy and contributed to a purposeful and fulfilling conference.

*Okason Morrison*

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GENERAL CHEMISTRY I

GENERAL CHEMISTRY II

GENERAL, ORGANIC, & BIOLOGICAL CHEMISTRY

ORGANIC CHEMISTRY I

COLLEGE ALGEBRA

PHYSICS (ALGEBRA-BASED)

FACILITATING TEAM-BASED LEARNING

FACILITANDO EL APRENDIZAJE EN EQUIPOS

## YES! YOU CAN IMPLEMENT PLTL ON YOUR CAMPUS!

What can you do to participate in, support and help disseminate the PLTL model?

*The students have always been the greatest force in PLTL, and if we are to continue to be successful we will have to continue to invite student participation in every phase – materials development, leadership training, course evaluation, dissemination, and institutionalization.*

1. Collaborate with PLTL campuses in your region to organize a local presentation on PLTL or a one-day workshop on PLTL to teach others. Find those Contacts on the PLTLIS website or email us at [info@pltlis.org](mailto:info@pltlis.org).
2. If you are a chemist, encourage a like-minded biologist, mathematician or physicist to try PLTL (and vice versa).
3. Mentor a potential implementer to prepare a plan to incorporate PLTL in their course.
4. Organize or join a group to write a proposal to implement PLTL in new areas or to implement new ideas within PLTL.
5. Participate in research efforts by working with the PLTLIS Research Committee to design and implement a research project that will assess the impact of PLTL on students or leaders in the context of your institution. Work with your campus Office of Institutional Research to obtain institutional data.
6. Organize a regional get-together of peer leaders from several institutions. This idea could also lead to sharing Peer Leaders between 2-year and 4-year institutions.
7. Explore and develop ways to link your PLTL leader training and workshop practicum to programs for teacher and future faculty development.
8. Design a program for your peer leaders that offers a continuum of opportunities to learn and participate in research pathways and the scholarship of teaching.
9. Set up a campus PLTL website as an outgrowth of your program – and link your website to the PLTLIS website.
10. Collaborate with your Peer Leaders to write workshop materials and contact the PLTLIS Workbooks Committee to publish and support your campus program..
11. Consider publishing in peer-reviewed journals and other publications. For ideas, see Publications on the PLTLIS website.
12. Build bridges to other reform initiatives.
13. Share your enthusiasm about PLTL with the larger community by providing science and other demonstrations at local high schools, youth groups, and other venues where Peer Leaders can lead learners.

# NOTES

