

PROGRESSIONS: PEER-LED TEAM LEARNING

EVALUATION OF DISSEMINATION EFFORTS: FACULTY READY TO ADOPT PLTL

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During the spring and summer months of 2000, the principal investigators of the National Science Foundation Peer-Led Team Learning (PLTL) Dissemination Grant conducted several two- to three-day interactive conferences at a number of sites, including Miami, Florida (April); Arecibo and Cayey, Puerto Rico (May); Pasadena, California (May); Philadelphia, Pennsylvania (June); and Portland, Oregon (August). An evaluation of participants' responses at those conferences was performed. Since the forms used to gather data were not identical, every site is not represented in each of the areas discussed below.

When asked what is most appealing about the peer-led workshop, respondents repeatedly pointed to the fact that

“students are actively engaged” in learning. About 40 percent of all comments struck this theme.

The role of the peer leader was often the connection to active engagement. Peer leaders and students doing model workshops always steal the spotlight and dramatize the effectiveness of the workshop better than a mere verbal description is able to do. Typical of an overall participant reaction is the statement: “The conference has convinced me of the value of peer-led teaching.”

It is common for teachers to question new pedagogical approaches, to look hard at whether or not there really is a compelling need to move into new territory. But problems with peer-led work-

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COMMUNITY COLLEGE SUPPLEMENT AWARDED TO ENHANCE NATIONAL DISSEMINATION GRANT

In early September, the Peer-Led Team Learning National Dissemination Project received word from the National Science Foundation that the Community College Supplement Initiative has been awarded to enhance the PLTL Model in community colleges.

Over five million students, almost 50 percent of all U.S. undergraduates, attend two-year institutions, which offer nearly 45 percent of all undergraduate science, mathematics, engineering, and technology courses. Fifty percent of all African American, Hispanic, Asian/Pacific Islander, and Native American students are enrolled in two-year colleges. Further-

more, 48 percent of all first-time freshmen attend community colleges, 58 percent of the total community college population is female, and 65 percent of the students are enrolled part-time.

Implementing peer-led team learning at the community college level necessitates addressing the barriers that confront two-year colleges.

Demographic Barriers

< Student mobility results in a highly transient population that makes it difficult to recruit and retain workshop leaders.

< Most students, including potential

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PROJECT NOTES: FOUR-TIER PLAN UNFOLDS

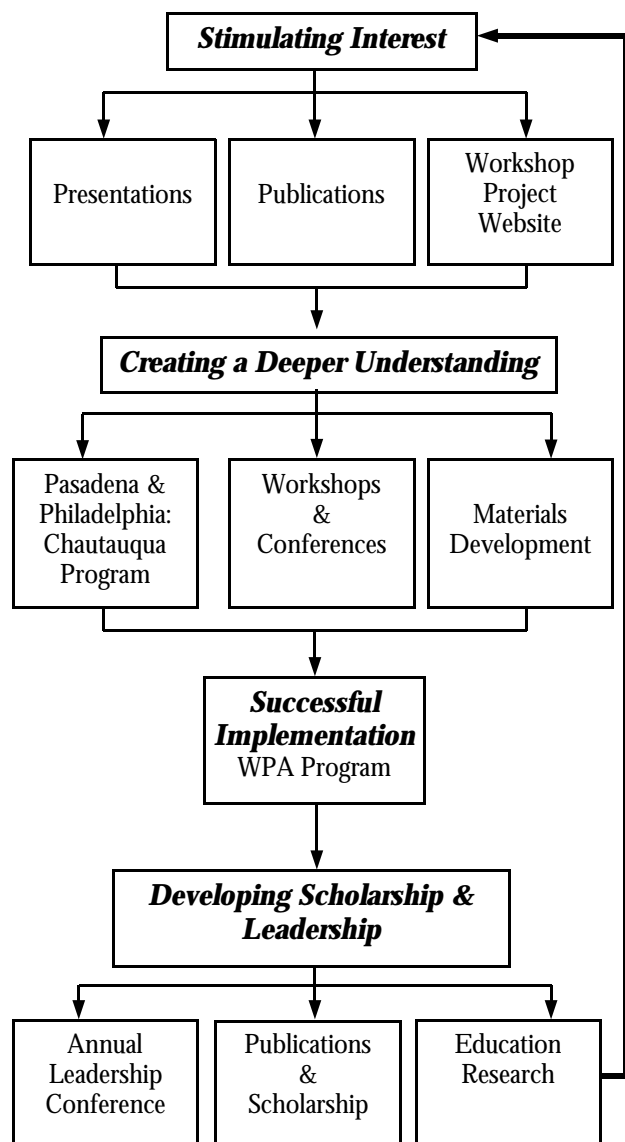


Figure 1. Dissemination activities form a positive feedback loop.

The focus of the Summer 2000 issue of *Progressions* is the dissemination and leadership activities of the PLTL Workshop Project. The variety and extent of activities reflect the four-fold strategies of the Workshop Project: 1) to stimulate interest in PLTL, through presentations such as the symposium at the 16th Biennial Conference on Chemical Education (BCCE) (page 9), and MADCP (page 18), and through our project website; 2) deepen understanding of the PLTL Model through intensive two- to three-day workshops; 3) assist implementations through the Workshop Project Associate (WPA) awards; and 4) develop leadership. These activities form a positive feedback loop (see Figure 1) which is intended to fortify the dissemination of the PLTL Model.

Over the past summer the Workshop Project conducted three intensive faculty development workshops. These were held in Philadelphia and Pasadena (through the aegis of the Chautauqua Program at <http://www.engrng.pitt.edu/~chautauq/>), and Portland (co-sponsored by the Oregon Collaborative for Teacher Preparation-OCEPT). In these, faculty, learning specialists, and student leaders participated in programs designed to give faculty a jump-start in implementing workshops (see article, page 1). In each case students from various campuses joined us in presenting the concept of peer-led team learning.

Assisting implementation is the WPA Program, for which the prerequisite for application is attendance at an intensive workshop, such as a Chautauqua session. Recent recipients are listed on page 19.

In the category of leadership, the Project co-sponsored, with the Learning Assistance Center at the University of Rochester, a conference with a special focus on leader training. Those attending generally had prior experience with peer-led workshops. Specialists in leader training from the Project conducted interactive presentations that focused on core issues of leader training, including pedagogy, diversity, leadership, learning styles, team-building, and metacognition. Articles in this issue drawn from presentations at the Rochester conference include those by Linda Dixon (page 3), Cheryl Rice (page 5), Lydia Tien (page 7), and reflections by participants (page 11).

The PLTL Workshop Project's Annual Leadership Conference will take place on November 3-5, in Newark, NJ. The focus this year will be on 1) development of materials in new disciplines (biology and physics); 2) scholarship of leader training and materials development; and 3) planning strategies for the coming year's dissemination activities.

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STAGES OF GROUP DYNAMICS: IMPLICATIONS FOR PLTL

Peer leader training is a key component of the PLTL Model. Training covers a variety of topics and activities, all of which are designed to prepare peer leaders for their responsibilities as facilitators of peer collaborative learning groups. Peer-led team learning is effective because it:

- ≪ provides academic tasks that help to focus group efforts;
- ≪ provides peer support in learning content material;
- ≪ helps develop social support networks that provide additional resources for learning;
- ≪ provides a non-threatening environment with peer support;
- ≪ encourages all students to be active participants and contributors to the task.

Group Development

The character of workshop groups should be expected to change over the duration of the term, depending on the group dynamics and what the group is able to accomplish. If peer leaders are aware of this natural cycle over time, they will be able to establish and maintain a healthy working environment within their group.

As group members work together they progress through a series of predictable developmental stages. The group must reach general understanding of interpersonal relationships and group goals before moving on to the next stage. If the group does not reach consensus, then it may regress to a previous stage.

Bruce Tuckman (1965) provides a theoretical framework for looking at how groups can change with time in the process of group development. His model presents an easy and efficient way to remember the stages which he defines as *Forming*, *Storming*, *Norming*, and *Performing*. Each stage involves both task functions and interpersonal relation issues.

Forming

Group members must orient themselves to each other and must determine what tasks are to be accomplished by agreeing why they

are there, what their goals are, and how they're going to accomplish those goals.

Storming

Interpersonal conflicts arise because of differing feelings about agenda, leadership, and authority. Conflicts must be resolved so that the group can function smoothly and move on to the next stage. The task functions for the group are to become organized and structured by agreeing on individual roles, and rules, and rewards.

Norming

In the third stage, group members resolve their differences and begin feeling and working cohesively, leading to feelings of relief and playfulness which lend themselves toward the sharing of information and ideas, the task function in this stage. However, this camaraderie can stall the group and prevent it from moving to the next stage.

Performing

The fourth stage sees the group members moving from a happy circle into interdependence, where they can function singly, or in subgroups, or as a full group. The task function of the group is problem-solving, and the group is highly productive at this point.

Group dynamics, then, is the way a group progresses through the stages from getting organized to being productive. Groups often tend to concentrate on task functions without addressing interpersonal relations, but both issues need to be dealt with for efficient and healthy functioning.

A similar theory to Tuckman's is "Cog's Ladder," a summary of which is included here (see sidebar, page 4). Boatman's (2000) summary of group development theories suggested over the last 60 years provides an overview of terms used to describe group processes (see page 4).

Knowing these stages helps peer leaders assess how their groups function and behave, suggesting methods for maximizing group performance.

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COG'S LADDER

The ladder is arranged with the beginning step at the bottom:

HIGH ESPRIT

- ? Intense loyalty/common interest
- ? High group morale
- ? Disagreement is appropriate and offered with respect

CONSTRUCTIVE

- ? Active listening
- ? Individual agendas given up for the group's agenda
- ? High creativity
- ? Group cooperation

BID FOR POWER

- ? Energy very high in this stage
- ? Conflict and possible combativeness may occur
- ? Cliques and individuals wield power and control

WHY WE'RE HERE

- ? Goals and objectives are questioned and ultimately established
- ? Individuals try to assess where they "fit in"
- ? Social cliques/subgroups may form

POLITE STAGE

- ? Getting acquainted
- ? Polite conversation
- ? Need for group approval is strong
- ? Conflict usually absent
- ? Judgments take place

Adapted from Charrier, G. O. (1974). "Cog's Ladder: A Model of Group Development."

Summary of Group Development Theories and Models	Phase I	Phase II	Phase III	Phase IV
Bales	Orientation	Evaluation	Control	Control
Thelen & Dickerman	Individual-Centered	Frustration Conflict	Group Harmony	Self-assessment, flexibility of process, productivity
Bennis & Shepard	Dependence	Counter-dependence	Resolution	Interdependence
Tuckman	Forming	Storming	Norming	Performing
Jones	Dependency	Conflict	Cohesion	Interdependence
Charrier	Polite/Why We're Here	Bid for Power	Constructive	Esprit
Francis & Young	Testing	Infighting	Getting Organized	Mature Closeness
Cherrey	Formative	Confrontive	Constructive	Reassessment

Group Behaviors

How individual members behave towards each other affects the group's behavior and its functioning. When group members speak, they might be 1) working toward accomplishing the group's tasks, 2) "fixing" relationships among group members, or 3) tending to their own desires without regard to the needs of the entire group and its tasks. The LeaderShape Institute, a college program for student leader development, identifies these three behaviors as Task-Oriented Behaviors, Maintenance-Oriented Behaviors, and Self-Oriented Behaviors.

Task-Oriented Behaviors are those that keep participants on task so that they can accomplish their goals. Behaviors that foster accomplishing tasks include:

Initiating task-related activities: proposing ideas or procedures; otherwise, no one would speak at all or side conversations would begin. Example: "Let's move on to the next step."

Seeking or giving opinions or information: promoting the clear and efficient flow of information; assures that decisions are made based on complete information and benefits everyone, not just the one who wants the information. Example: "We could take a look at this in our text."

Clarifying or elaborating: listening and collaborating so that important information is not lost; helps illuminate or build upon others' ideas or suggestions, e.g., "What if we added this step to the process?"

Summarizing: pulling the discussion together so that everyone can assess progress, e.g., "So first we'll do this part and then we'll do that, right?"

Consensus testing: urges participants toward a decision and adds positive tension, e.g., "Can we vote on this now?"

Maintenance-Oriented Behaviors are those which assure that the group maintains a good working relationship and continues toward its goals. They include:

Gatekeeping: keeping communication open by bringing quiet members into the dis-

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RELATIONAL LEADERSHIP AND ITS USEFULNESS TO THE WORKSHOP MODEL

"I'm not too worried about knowing the material because I took the course last year and I'm taking a course beyond it now. What I'm not sure about is whether I'm capable of being a good leader. I hope I can be the kind of leader the students in my group are going to be able to relate to and like." Such thoughts often go through the minds of students new to the role of workshop leader.

Trainers of peer leaders can help assuage the fears of both beginners and experienced leaders with the introduction of the Relational Leadership Model. This model, proposed by Komives, Lucas and McMahan (1998), suggests that effective leadership skills are not inborn, but can be learned. This simple, straightforward model can comfort the peer leader in knowing that good leadership is a relational process and is the responsibility of all members of the group, not just that of the leader.

Relational Leadership is a shift in paradigm from the traditional view of a leader as someone who has natural abilities to be charismatic, persuasive with people, and able to exert power and influence. If peer leaders assume this to be true, it is no wonder that they may feel intimidated.

The Workshop Model and Relational Leadership are particularly compatible because the role of the workshop leader is to be a group facilitator of learning and problem-solving rather than a junior instructor repeating the professor's lecture. A workshop group can establish itself as an effective community of learners by using this model.

Borrowing from Gardner's (1989) view, this community of learners will share a common vision and commitment to:

- ? effective internal communication;
- ? shared leadership tasks;
- ? group teamwork, maintenance and governance;
- ? development of all members;
- ? inclusion of all participants, their needs, weaknesses, diversity, and strengths;
- ? a group culture with resulting interpersonal bonds and shared experi-

ences;

- ? accomplishment of the purpose of the group, the purpose being, "... for the student participants to construct their own genuine knowledge of the discipline by working through real issues." (Roth, *et al.* 2001)

As Komives, *et al.* state, Relational Leadership is a framework that connects five key elements:

1. *Inclusion:* Understanding, valuing and actively engaging diversity in views, approaches, styles, and aspects of individuality such as gender and culture. This fosters a sensitivity to disabilities, differences in learning styles and personalities, and so on. Group participants are not invisible, they affect the group by influencing the whole with their distinctive behaviors, whether they sit quietly or take an active part in the process.

It is not always easy to take an inclusive view of group dynamics. As one student leader states, "Being inclusive is difficult because you must step out of your comfort zone to expand your organization or vision. Inclusive means sharing ideas or beliefs rather than selling or telling." (p. 73)

2. *Empowerment:* Leadership is shared; participants *must* assume responsibility for the group outcomes because, in reality, they simply *are* responsible. There are two interrelated dimensions to empowerment. First, *each* participant assumes ownership of the outcome of the group process, by asserting him/herself, and expecting to be included in every way. Secondly, such an environment promotes the full involvement of all participants, no matter their current degree of understanding of the content, or what personality or learning style factors they may bring to the group.

The individual says, "I have a legitimate right to be here and I can say what I feel and think. I can ask 'stupid' questions, if that is where I am." The group in turn says to the individual, "You should be involved in this; you have the right to be here and say what you feel and think. You join the rest of us in being responsible for what happens in our group."

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"Being inclusive is difficult because you must step out of your comfort zone to expand your organization or vision. Inclusive means sharing ideas or beliefs rather than selling or telling."

Several key processes are essential to both [the Relational Leadership Model and the PLTL Model]: inclusion, collaboration, and empowerment of all group participants; community building; a profound dedication to understanding and appreciating others; and, a personal commitment of each member to the goals of the group.

RELATIONAL LEADERSHIP

(Continued from page 5)

3. *Purposefulness*: Committed to goal or activity. Each person will have a very individualized effect on the group, but the group's purpose will be unified if there is a shared vision or purpose. "Being purposeful requires having an attitude of hope, an ability to make a commitment; it builds on a sense of personal and group empowerment." (p. 87)

4. *Ethical Behaviors*: Leadership driven by positive values, a commitment to that which is moral in nature, "Do unto others as you would have them do unto you." The Golden Rule allows for people to accomplish change or make a difference to benefit the common good. Individual honesty, integrity, and good will are important values in any leadership/group situation.

A student offers some excellent advice on the subject: "To handle ethical dilemmas, the single most important quality to remember is to be honest with yourself and others. Tell the parties involved honestly and openly how you feel about the particular issue. One other important aspect is listening and not jumping to conclusions." (p. 93)

5. *Process-Oriented*: Occasionally, the group can neglect the humanity of its members by becoming too task oriented. The group must be alert to the possibility that the process can overshadow the purpose/mission of the group, or devalue the people involved.

If there is a tendency toward this, the leader and members need to step back, reflect on the procedures that have developed in the attempt to accomplish a task, and check to see that these are congruent with the other key elements of Relational Leadership.

What better model for leadership and group dynamics could be incorporated into the training of peer leaders than the Relational Leadership Model? Several key processes are essential to both: inclusion, collaboration, and empowerment of all group participants; community building; a profound dedication to understanding and appreciating others; and, a personal commitment of each member to the goals of the group. The Relational Leadership Model can assuage any peer leader's fears regarding his or her effectiveness as a leader for a workshop group.

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References

Komives, S., Lucas, N., and McMahon, T. (1998). *Exploring Leadership, for College Students Who Want to Make a Difference*. San Francisco, CA: Jossey-Bass Publishers.

Gardner, J.W. (1990). *On Leadership*. Free Press.

Roth, V., Goldstein, E., and Marcus, G. (2001). *Becoming a Peer Leader: A How-To Guide*. Englewood Cliffs, NJ: Prentice Hall.

MULTI-INITIATIVE DISSEMINATION PROJECT (NSF 2000 - 2003)

To introduce faculty to the four systemic initiative projects in chemistry, the National Science Foundation is sponsoring the three year Multi-Initiative Dissemination (MID) Project, which will offer eight one-and-a-half-day academic year workshops in geographically diverse locations and two three-day summer immersion workshops. The former will be introductory in nature and will allow the participants to make an informed choice of a summer workshop.

The leadership of the MID Project is composed of representatives from each of the

systemic initiative projects, of which the PLTL Workshop Project is one and is being represented by Pratibha Varma-Nelson.

The first one-and-a-half-day academic year workshop will be on November 10-11, 2000 hosted by Coastal Carolina University, coordinated by Dr. John Goodwin.

More information on the MID project, and schedule and location of workshops, can be found at: <http://intro.chem.okstate.edu/midp>.

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*Information on the MID project can be found at:
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PROMOTING METACOGNITIVE BEHAVIOR IN WORKSHOPS

Leader training is one of the Critical Components of the Peer-Led Team Learning (PLTL) approach. Students who are selected as peer leaders have been chosen in part because of their performance in the class and their communication skills. However, without training, peer leaders are not experts in the discipline or experienced in facilitating productive problem-solving discussion. Thus, leader training is important in making problem-solving strategies and issues explicit to the peer leaders and sharing instructional approaches that may be effective in the PLTL workshop.

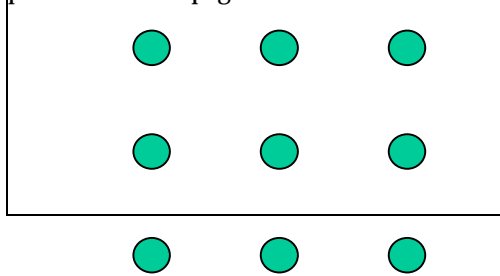
While these strategies may be ones that the peer leaders already use, leader training makes these strategies explicit to the leaders so that they can share these approaches with their students.

The novice-expert paradigm serves as a framework for understanding how students in our classes (novices) compare to experts (professors). The PLTL workshop fits this paradigm where the peer leaders facilitate problem-solving and discussion to help the students become more like experts. Studies of experts and novices solving problems have sought to characterize their behaviors and found that there is a difference in the following areas: knowledge base, problem-solving strategies, and metacognitive behavior. This paper focuses on the latter and discusses some strategies for leader training to promote metacognitive behavior in the PLTL workshop.

What is metacognition? Rickey and Stacy (2000) provide a discussion of metacognition in the chemistry classroom. Briefly, metacognition refers to the ability to reflect upon one's personal knowledge and/or thinking and the ability to act on what one knows. This involves being aware of what one is thinking as well as the ability to regulate one's thinking process. Why is it important to promote this in the classroom? Educational research has demonstrated that it is valuable for the development of conceptual understanding and problem-solving success. Naturally, the question for leader training is: how do we prompt peer leaders to realize the importance of metacognition, and how can they promote its behavior in the PLTL workshop?

In training peer leaders, it is important to share the rationale and context for the exercises and instructional strategies so that the peer leaders can see the purpose in trying them in their workshops. Consider the problem presented in Figure 1.

Figure 1. Draw four straight lines that pass through all nine dots without raising the pencil from the page.



The nine-dot problem can serve to open the discussion in leader training about the importance of being aware of what one is thinking while solving a problem, including what assumptions are made, and being able to “think outside the box.” Initial representations can shape the course of our problem-solving. The problem solver may include information that is not in the problem statement or include irrelevant information. Without exhausting all possible permutations for the nine-dot problem, reaching a solution requires the problem solver to evaluate one's problem-solving progress and consider what leads to problem-solving failure (e.g., the assumption that the line may not extend beyond the area established by the nine dots). This problem serves as an illustration of the importance of reflecting on what one is thinking while solving a problem. How can peer leaders prompt their students to reflect and monitor their thinking?

One approach to promote metacognition is modeled after Alan Schoenfeld's (1985) question-asking approach. He repeatedly poses the following three questions to prompt his students to reflect upon their problem-solving process: “What are you doing? Why are you doing it? Where do you think it will get you?”

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In training the peer leaders, it is important to share the rationale and context for the exercises and instructional strategies so that the peer leaders can see the purpose in trying them in their workshops.

PROMOTING METACOGNITIVE BEHAVIOR

(Continued from page 7)

As part of the leader training, it may be productive for the peer leaders to brainstorm possible questions to prompt student reflection. Some additional questions may include the following: "Am I done with this problem? How could this have been done another way? How can this be generalized? Is this similar to something we have already seen/done? What are my assumptions? Are they valid/reasonable?" Schoenfeld found that his students grew to expect his questions and consequently considered their responses before being asked. In the same way, students in a PLTL workshop can begin to expect such questions and internalize such critical thinking behavior in anticipation of being asked such questions.

A second approach to promote metacognitive behavior is the pair problem-solving approach developed by Whimbey and Lochhead (1986). (For another description of the pair problem-solving approach, see Narode, 2000, *Progressions*, Vol. 1, Issue 3.) In this approach, students work in pairs where one student is the "problem solver" and the other student is the "listener." The "problem solver" is asked to read the problem aloud and to verbalize while solving the problem. The "listener" is instructed to listen carefully and remain quiet except to pose questions that encourage the problem solver to verbalize, e.g., "Can you explain what you're doing?" or ask for clarification, e.g., "Can you explain what you mean by that?" Students then switch roles for the next problem.

Figures 2 and 3 present two possible problems to use as training exercises for peer leaders. However, it may be more productive to implement the pair problem-solving approach with problems from an upcoming workshop.

Using the pair problem-solving approach during leader training also has value. (For reflections on the pair problem-solving approach from the peer leader perspective, see Burg, 1999, *Progressions*, Vol. 1, Issue 1.) The peer leaders have an opportunity to develop their listening skills and practice possible responses to prompt students to reflect on their problem-solving process. From these experiences, peer leaders also have a sense of the pitfalls and potential drawbacks to the method and can be sensitive to that in the PLTL workshop.

Participants in the conference on *Training Peer Leaders* at the University of Rochester (June 18-20, 2000) were asked to try the pair problem-solving approach using the problems in Figures 2 and 3 and provided the following feedback. First, participants found that the roles of the problem solver and listener can easily break down. For instance, the listener may be tempted to share

Figure 2. Water and Wine Problem (from Herron, 1996).

You have a glass of water and a glass of wine. Assume that both are pure, homogeneous substances. Transfer one teaspoon of water to the glass of wine and mix thoroughly. Transfer one teaspoon of the contaminated wine to the water. Now both the water and the wine are contaminated.

Consider the amount of contaminant in each container.

Which of the following is true?

- A) The amount (volume) of water contaminating the wine is greater than the amount (volume) of wine contaminating the water.
- B) The amount (volume) of wine contaminating the water is greater than the amount (volume) of water contaminating the wine.
- C) The amount (volume) of water contaminating the wine is equal to the amount (volume) of wine contaminating the water.

Figure 3. Jose and Arthur are two friends who decide to run in opposite directions around a track. Jose takes 40 minutes to complete one circuit. Jose and Arthur pass each other every 15 minutes. How long does it take Arthur to complete one circuit? (from Whimbey & Lochhead, 1986)

thoughts about the solution process such that both individuals end up solving the problem. While the PLTL workshop encourages such collaboration, the leader may need to remind the students that the purpose of the pair problem-solving approach is to develop critical thinking and listening skills rather than collaborative skills. Second, the problem solver may find it overwhelming to verbalize his/her thoughts while solving the problem. One suggestion is to adapt the pair problem-solving approach by allowing the problem solver to think through the problem prior to verbalizing his/her thinking process. Third, the listener needs some guidelines in what questions to ask and when to pose them. One suggestion is to have the listener only ask questions from a short list of possibilities such as the reflection prompts discussed earlier. Fourth, the problems selected for the purpose of training peer leaders should not be too difficult such that the students cannot practice the skills associated with being the problem solver or the listener (e.g., some participants found the problem in Figure 3 to be too math intensive). Such issues can be addressed in leader training so that peer leaders have an idea of not only what to expect when implementing the approach in the work-

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PLTL WELL-REPRESENTED AT BCCE

There was active participation by the members of the PLTL Workshop Consortium at the 16th Biennial Conference on Chemical Education (BCCE) held at the University of Michigan, Ann Arbor, from July 30-August 3, 2000. The activities included a two-session symposium on PLTL, several workshops and talks, poster sessions, and an exhibit booth visited by many conference participants.

Symposium

A two-session symposium on "Peer-Led Team Learning," organized by *Pratibha Varma-Nelson*, promoted interaction among educators who have developed models that involve undergraduate peers in the process of teaching and learning, showcased the work done by some of the Workshop Project Associates (WPA's); and summarized and celebrated the accomplishments of the members of the Workshop Project, a systemic change initiative funded by the National Science Foundation. *Marilyn Miller* (University of Missouri-Columbia) presented, from a historical perspective, an overview of models gathered from universities in the USA, Canada, and Australia, that use undergraduate students as peer tutors, mentors, teaching assistants (TA's), group facilitators, and faculty partners.

Rosita Baez (Cayey University College, Puerto Rico) reported on the CHEM-2-CHEM program, a mentoring and tutoring program offered by upper-class students to entering students registered in general chemistry courses. Data presented from five semesters demonstrated that achievement and retention increased in these courses. *Brian P. Coppola* (University of Michigan) described the curricular program in which, each fall, 160 students earn Honors credit in a peer-led Supplemental Instruction (SI) program. These sessions, led by junior and senior students who are collaborators in the design, are called Structured Study Groups (<http://www.umich.edu/~michchem/SSG>). Assignments are organized according to principles of reciprocal teaching and the development of interpersonal explanatory knowledge. Students bring written assignments to the sessions and engage in structured peer group critiques facilitated by the upper-level undergraduate leaders. *Tom Greenbowe* (Iowa State University-Ames) presented an entertaining discussion on why and how it is necessary to change or alter the assessment of students when the basic mode of instruction is changed.

Gwen Shusterman (Portland State University), a WPA recipient, presented data on implementation of PLTL workshops at her institution in general and organic chemistry courses. In both cases the students who were in workshops did better than the others in the class. However, only a portion of the class was enrolled in the work-

shops. *Joseph Wilson* (University of Kentucky) described three years of experience with the PLTL Model and presented results obtained in the general chemistry course, in which the students who participated in the workshop outperformed the class as a whole. A variety of practical issues was discussed, including scheduling, attendance, leader selection and development, and faculty involvement. With regards to continued funding of the program at his institution, Wilson stated that, "although to this date the administration has been unable to find funds for permanent support of the program, a number of signs point to success in the near future."

David Garin (University of Missouri-St. Louis), another WPA recipient, talked about his experiment in which he used both undergraduate and graduate students as workshop leaders. Comparison with historical data indicated that the workshop groups performed at a comparable level; however, in all evaluations, students repeatedly supported the workshop concept and found it to be one of the most valuable components of the course. The graduate teaching assistants overwhelmingly preferred the workshop to traditional recitation sessions.

Michael Golde (University of Pittsburgh) presented initial results of a project in which the graduate TA is replaced in some general chemistry lab sections by four undergraduate mentors, each of whom supports a group of four to eight students using strategies developed by the Workshop Project. The program has been in existence for two years, and has been enthusiastically received by the students.

Leo Gafney (Workshop Project Evaluator) presented data that suggest that the PLTL Model improves student performance at various types of institutions, demonstrating that it is a robust model, easily transported to other campuses. Details can be found at the Project website. Gafney also discussed how the analysis of data collected in the evaluation of the Workshop Model led to the development of the six critical components necessary for a Workshop program to be successful (see page 19).

David Gasser (City College of New York) elaborated on the important role of appropriate materials for the success of workshops and discussed how these materials could profitably embed modes of scientific learning and discovery. An example is the "haptic" dimension, the use of physical models to aid in investigations, as illustrated by Linus Pauling and later utilized by James Watson and Francis Crick in the solution of the structure of DNA. A second example is the use of pennies to illustrate the particulate nature of matter. Gasser concluded by announcing

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PLTL WELL REPRESENTED AT BCCE

that manuals containing workshop units for several chemistry courses and the Guidebook could be obtained from Prentice Hall (see page 20 for further details).

Jeffrey Trautmann (University of Montana, Missoula) spoke of PLTL as being an application of Vygotskian theory that facilitates the learning of both algorithmic and conceptual knowledge (see also Cracolice, 2000, *Progressions*, Vol. 1, Issue 2). According to Vygotsky, language is acquired socially, and is the basis for thought, therefore learning has socio-cultural roots. In a social constructivist classroom, learning occurs when instruction proceeds ahead of development because the instruction is targeted at the student's Zone of Proximal Development (ZPD). This zone represents the range of problems that a student is capable of solving when he or she is assisted by a capable peer or by an instructor. Assistance is gradually removed until the student becomes capable of solving a more difficult range of problems (a technique known as scaffolding). Having incorporated these newly learned concepts into his or her cognitive structure, the student is now capable, with assistance, of solving a more difficult range of problems. PLTL provides a social constructivist, scaffolding environment in which students can continuously work within their ZPD and optimize their learning.

Ellen Goldstein (City College of New York) presented an overview of leader training components, including recruitment, interviewing, selection, and a description of coursework that covers pedagogy and learning theory. Also mentioned was the pilot synchronous distance learning course for leader training that supports a community college collaborating with a four-year college. *AE Dreyfuss* (City College of New York) then discussed a theoretical base of learning styles, and presented preliminary results from a comparative study of learning styles in a general chemistry course at CCNY.

Jack Kampmeier (University of Rochester) analyzed the ways that the key ideas and practices of the Workshop Model are adapted and adopted in different institutions, and analyzed these experiences against the goals of systemic, permanent change. Distinct implementation and institutionalization phases were identified. A checklist for implementation described the steps in the process. Benchmarks for assessing progress toward institutionalization were presented. Kampmeier emphasized the importance of allies in both phases. Intermural alliances with established programs and experienced mentors are important ingredients of successful implementations. In contrast, intramural alliances with college programs and structures that share the goals and methods with the PLTL Workshops provide powerful forces for institutionalization. At the present time, more than half of the implementing faculty and

learning specialists thought that PLTL would outlive their individual efforts.

Workshops

"Workshop Chemistry: Peer-Led Team Learning" was presented by *Mark Cracolice* (University of Montana, Missoula), and *Victor Strozak* (City University of New York). *Jack Kampmeier* (University of Rochester) was joined by student leaders *Awista Ayub*, *Sara Eleoff*, *Hassim Jamil* (University of Rochester) and *Andrei Lalla* (City College of New York) for a demonstration in "A Workshop Approach for Active Learning in the Introductory Organic Course." *Kampmeier* also presented on "The Spectrum of Active Learning Methods Used in Introductory Organic Classrooms," with *Pratibha Varma-Nelson* and *Donald K. Wedegaertner*.

Talks about PLTL in other Symposia

John Deming (University of Montana, Missoula) discussed "Peer-Led Team Learning: An Action Research Approach in Secondary Science Education." "Perspectives of a Peer Leader: Preparing Future Science Teachers at San Jose City College through Peer-Led Team-Learning" was presented by *Madeline Adamczeski* and *Shannon Neville* (both from San Jose City College, San Jose, CA). *John Goodwin* (Coastal Carolina University) and *Jerry Sarquis* (Miami University, Oxford, OH) reviewed the "Progress Report of the 1998-WCC Adapt and Adopt Workshop Chemistry Consortium." "A Study of Content-Knowledge Gains for Peer Leaders? Research From the CCLI-Adapt and Adopt Program" was explored by *Robert Blake* (Indiana University Purdue University-Indianapolis, Indianapolis, IN).

Mark Cracolice (University of Montana, Missoula) discussed "From Adapt and Adopt to Institutionalization: The Integration of NSF-Sponsored System Reform into Chemistry Curricula." "Bringing Workshop Chemistry to the Community Colleges" provided discussion of a new direction for the PLTL Project, and was presented by *Victor Strozak* (City University of New York), *Dennis Bartow* (Prince George's Community College), and *Madeline Adamczeski* (San Jose City College), all of whom are Co-Principal Investigators for a supplemental award to the National Dissemination grant (see page 1 for further information).

Posters

Phyllis Anderson-Meyer (Saint Xavier University, Chicago, IL) presented "Workshop Chemistry: Making Sense of It All," and *Kereen Monteyne* (University of Montana, Missoula) presented her experiences with "Peer-Assisted Active Learning."

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REFLECTIONS ON *TRAINING PEER LEADERS*

The first conference on *Training Peer Leaders*, held at the University of Rochester (UR), Rochester, NY, June 18-20, 2000, was organized by Vicki Roth, Assistant Dean, with able assistance from Nirmala Fernandes and Lydia Tien, both Academic Support Coordinators, and Awista Ayub, Sara Eleoff, and Hassan Jamil, UR Workshop Coordinators. Jack Kampmeier, PLTL Project Co-PI, provided direction and support. The conference was sponsored by the PLTL Workshop Project and the University of Rochester Learning Assistance Services.

Participants were asked to respond to two questions: 1) What was the best learning experience you had, and why? And 2) What are you ready to do now?

The "hands-on" examples provided fantastic explanations/justifications for what peer leader training sessions should include. In particular:

--Vicki's [Roth] music metaphor was a gentle, yet powerful, way to begin a discussion of the strength inherent in diversity;

--the concept map exercise (water cycle) really demonstrated concretely how different individuals function in a group in ways that reflect their learning styles. It also opened a window into how the concept map exercise itself is a powerful tool for generating discussion in a workshop group;

--the pair problem-solving exercise revealed a few important insights. First, we all (academics in particular, I think) need to develop critical LISTENING skills. Second is that what is most valuable to foster in students is a self-awareness of how they solve problems--NOT necessarily whether they get the right answer.

Another response to the first question is one that may be a *cliche* and obvious. But as one who hasn't attended a conference outside my scientific discipline before, I feel so strongly about it that I'm going to write it anyway: Interacting with such dedicated and caring colleagues to pursue our common goals not only filled my mind with ideas about how to develop a peer tutor training program, but also filled my heart with the excitement, en-

thusiasm and energy to put them into action. My thanks to both organizers and attendees for the personal growth opportunity.

I came to Rochester with the general notion that training peer leaders was a good idea. I left doubly convinced of this, and with a vision of how to put it into practice on my campus:

--understanding the importance of the relationship between content and learning experts, I'm ready to seek out those with learning expertise on my campus;

--talking with a variety of learning specialists at this conference and discovering all of the niches/titles they hold at their respective colleges, I gained a good sense of where to look for their peers at my institution;

--I'm ready to present/promote the peer learning model to individuals and organizations on my campus (like the Teaching Academy, and the Center for Biology Education), and seek colleagues to help put a structure in place for facilitating the development of peer mentoring programs;

--I'm ready to develop a WPA proposal, both to stimulate the initiation of peer tutoring in my classroom, and also to maintain a connection to the wonderful group associated with the Workshop Project whom I met this past weekend.

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The best learning experience were the activities. I especially remember the pair-sharing problem solver and listener, the musical cultural diversity activity, the concept map group activity, and the pipe cleaner activity. The hands-on helps us remember and thus actually use in the future. The second best thing I took home were the handouts and green books... great, detailed information!

Here's what I am doing...I recopied my notes and organized all the material into a notebook (what kind of learner am I?). I made an appointment with two Organic faculty to bring them up to date on Workshop and to see if they decide to proceed. The one thing I will

(Continued on page 12)

Interacting with such dedicated and caring colleagues to pursue our common goals not only filled my mind with ideas about how to develop a peer tutor training program, but also filled my heart with the excitement, enthusiasm and energy to put them into action.

I am also better able to persuade my less-enthusiastic colleagues with the argument that the time I spend on my leaders produces better-prepared majors who are more confident in their own abilities and who are able to speak eloquently about their knowledge and experience.

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not do is to do this for them; it needs to be a joint effort.

Some areas that I felt were lacking are problems or mechanical issues such as getting the students to attend if it is mandatory (this is a professor issue so I won't worry about it). Also, the one area I feel the workshop is weak in is evaluation. I do much more in that area with Supplemental Instruction (SI) leaders through observations, surveys, data gathering. This may be an area you all will explore and expand in the future.

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The best learning experience and why? This is difficult to answer, mostly because there were so many different learning experiences - I guess that means that I still have a lot to learn! If I had to choose one general area, it would be the sessions that focused on learning styles, developmental theory and problem-solving. I find it very useful to think about all of these at the same time, especially when I am writing materials for a workshop, and when I am talking with peer leaders. I will definitely use much of what we discussed in my classes and in the leader training course.

For example, I plan to administer a learning style inventory, such as [David] Kolb's, to my leaders and then do a series of selected workshop problems to reinforce in their minds how the problems may be geared to different learning styles. I will also do this in my upper-level chemistry courses and then talk with the classes about how they can maximize their learning by being aware of their learning styles (I'll probably pre- and post-test them even).

In addition to what I wrote above, I am much more prepared to sit down and talk with our learning specialist (actually probably a committee of several people) about the training course. A very nice part of what happened at the conference was the sense of ownership it has given the student leaders who attended. When we talked about what to do when we returned to CCU, they basically took over, and will play a large part of our leader training.

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I have to classify the group activities as the best experience I had. I enjoyed working in groups, which is surprising considering how much I hated it when I was an undergraduate... I was one of those standoffish students who thought they knew what was going on better than everyone else. I think it is important for the faculty and learning specialists to experience the same social interaction and team-building that we ask our leaders and students to go through. I especially liked the concept-mapping exercise,

and I see very clearly how such exercises can be used to encourage students to take active control over their learning processes.

I am much better prepared to run an effective peer leader training program than I was before. I realize now just how important it is to train leaders in learning styles, people-management skills, teamwork and diversity so they can cultivate these properties in the students we ask them to lead. I am also better able to persuade my less-enthusiastic colleagues with the argument that the time I spend on my leaders produces better-prepared majors who are more confident in their own abilities and who are able to speak eloquently about their knowledge and experience.

P.S. I have finished putting all the photos I took up on my web page (<http://www.siu.edu/~michsha>) under the heading "summer conferences."

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I thought the conference was terrific! I have been coordinating a version of a workshop program (albeit a twisted one that barely qualifies!) for several years, and I have always felt alone. I have faculty support, which is incredibly important, but I have had no guidance. In fact, I was not aware that the Workshop Model even existed as such, much less that it was born in Chemistry, my own stomping ground! The *Training Peer Leaders* conference in Rochester provided an instant guidance fix! To come across so much information, (not simply stimulating but immediately relevant!) compacted into three days, was thrilling and exhausting. I came home excited and motivated, but now I feel overwhelmed with possibilities. I don't know what to do first: formalize a training program for the leaders? Consider the selection process? Expand my workshop program to include organic chemistry? Tackle the room shortage? All avenues are appealing but each is a hefty project, boasting its own obstacles. And those questions don't confront the immediate: should I write a grant proposal? Should I call a faculty meeting? Should I set out in search of the right learning specialist? In an ideal world where I can dedicate all my time to promoting the Workshop Model, the answer to all is "yes!" But alas... I do not mean to be complaining, but to be sharing.

One of the benefits of participating in the conference was the sharing -- experiences, visions, realities, successes and failures. I came away from the conference not only with valuable tools and techniques for training peer leaders... not only with handy problem sets (Thanks Jack!)... but also with a sense of community. Community provides validation of one's efforts, which yields the confidence to forge ahead. The enthusiasm with which the par-

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Participants infected one another rivaled the sense of commitment to the Project emanating from the coordinators. It sounds corny, but it was truly a pleasure to be there. I learned a lot, and the company was top notch.

It was also a pleasure to find the George Eastman House! Not to mention the *Midnight Ramblers!* Thanks for everything. I hope the enthusiasm I enjoyed at the conference is generating lots of positive feedback. I will be in touch as I proceed -- it is tough to give this project the time it deserves.

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My best learning experiences: Vicki Roth's Diversity D.J! I felt this exercise really hit home. It is a great introduction into the topic of diversity because it initially gives people a more comfortable context to discuss diversity issues in that of music. This was a real (vs. something more far-fetched) example and I greatly enjoyed the discussion it fostered. This is a fabulous take-home activity for leader weekly meetings. I also liked the newspaper headlines as a topic of discussion.

Linda Dixon's presentation was awesome as well. I took away many hands-on activities that could be incorporated into leader training and I benefited from her discussion of Group Behaviors (see page 3). The active involvement of conference participants was wonderful.

I also enjoyed Lydia Tien's presentation of thinking and problem-solving strategies (see page 7). I gained insight from the 4-step process she presented -- 1. understand the problem; 2. establish a plan; 3. implement a strategy; and 4. evaluate progress. Her comment that students spend most of their time implementing a strategy and that leaders should help to balance their group's focus among all four steps really hit home.

I am now more prepared to further develop the leader training program and incorporate more activities (those of Vicki Roth and Linda Dixon) into our weekly meetings. I also feel that I have more resources to share with my students about the problem-solving process and categories of group behaviors.

Topics I would like to see in future conferences include:

- ✍ how to facilitate and make the most of interactions between first-time leaders and leaders who come back to lead a second time.
- ✍ the nuts and bolts of role-playing: perhaps to see examples on video and/or take part in a role-playing exercise. How do you organize role-playing and make it REAL so that the students are willing and interested in participating in this

exercise?

- ✍ a timeline of leader training: when should certain topics be presented to leaders, how many workshops should leaders have under their belt before they are ready to think about topics such as learning styles, diversity, etc. or are these topics to be presented before the start of the semester and revisited later?
- ✍ and of course, more fun activities to share with workshop leaders!

I really enjoyed the conference. Thank you very much!!!!!!

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I enjoyed the Peer Leader conference, specifically learning about the impact a peer leader can have in the learning experience of another peer. Training is the key for a peer leader to be successful in helping another peer. The peer-led model takes a look at all the barriers that prevent learning and focuses on the elements that contribute to learning. The model sets an environment for students to think critically and solve their problems. I think that the PLTL Model is powerful because it looks at learning as a process and give students the opportunity to take charge of their own learning.

The conference was very organized, focused and informative. I learned a lot from people who ran the workshops and from other people from other colleges. I am thankful for this conference because it gave me a different framework on how to help students academically, specifically in the field of science (chemistry). On a scale of 1-10 (10=excellent), I give the conference a 10 for both organization and content.

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I have been tutoring for three years at Queensborough Community College. When I've tutored a student, I have sometimes solved his/her problems for him/her and asked him/her to repeat or to apply my steps to solve similar problems. I wanted my students to get the right answers by repetition. I didn't quite believe that the team effort to solve a problem would work because you are on your own when you take a test in a chemistry class; however, I realize that working in a group, each participant (student) learns different approaches to the same problem as well as cooperation and teamwork.

By learning the new and different methods to solve a problem, students can reexamine their own solutions, and they can make corrections or solidify their methods by ex-

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REFLECTIONS ON *TRAINING PEER LEADERS*

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plaining to a group. Throughout the workshop, I learned that a group is much more meaningful than just cooperation between participants. A group can accomplish a task which no individual can achieve. I want to consider it as an achievement from group dynamics, since like an organism, a group can do more than its parts. I had a really excellent experience at the University of Rochester.

HangKyu Park
Queensborough Community College, CUNY

This conference helped me understand biology group tutoring situations in a new way. When another biology tutor and I began to work together, we had to learn how to be a team, but we didn't know what to expect from the students. We thought the only team-work that would happen was between the two of us leaders. We were working with a skeletal model answering student questions after a review. At one point students started answering each others' questions. We didn't know whether this was a good thing or not. After the discussions this weekend, I know this was a good thing. We need to model for students how to ask questions and how to listen and respond to questions. Students learning from each other and helping each other are wonderful ways to show that everyone has information to share. This seems to be the philosophy of PLTL.

Boris Mullokandov
Queensborough Community College, CUNY

This was a wonderful opportunity to interact with intelligent, enthusiastic faculty, committed to supporting student learning. We are in the process of reviewing some of what we learned. We were all impressed by both the quality and quantity of shared information. I was pleased at the inclusion of references to Belenky and Gilligan about women and learning in the literature. Support for women in science is a major concern here [at QBCC]. The one area where I thought more needed to be said (plus an appropriate handout) was in regards to learning disabilities. It seems possible that some dropouts or non-participants (some of the leaders cited these as problems in their groups) behave the way they do because of frustration related to their disabilities. Aren't these students often the ones who withdraw from group work or who find that time allotments for problem-solving do not fit their personal needs? Can we train leaders in ways to supplement the learning of such students in one-to-one situations, etc? We are planning to have two leaders for each [workshop] session; the second leader will work with indi-

viduals who need a modified pace or approaches.

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I thought this was an excellent conference with quality presentations and lots of good discussion. I have already made the survival kits (Linda Dixon) which I plan to use in conjunction, during my session with students, on "Building Boundaries: Taking Care of Yourself." I also loved the pipe-cleaner a la chenille-sticks activity (Linda Dixon) and Cheryl Rice's session on her training method. I have her book and plan to use parts of it in my training sessions. Ellen Goldstein and AE Dreyfuss (on Learning Styles and Concept Maps) also gave good and useful sessions. The two things that really struck me was that training of student leaders has come into its own, as well as that there are a number of activities and ideas that I can put to immediate use.

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Lyn Isaacson and I just finished the initial training for our peer leaders. I can't imagine how we would have done it without the peer leader training seminar in Rochester this summer. Since this is our first year doing PLTL, the seminar was a tremendous concrete benefit to us, providing almost all the material for our training session.

In addition, the seminar served to more thoroughly acquaint all of us with the Workshop Model and with each other. In fact, the seminar was the first time that the three of us (chemist, learning specialist, and peer leader) had met as a group. It provided a focused forum for us to exchange ideas and feel comfortable with each other.

I also appreciated the opportunity to meet other people involved with the PLTL Model. I now more fully understand the history and the breadth of its use.

The presenters and the organization of the seminar were excellent. All of us from Central enjoyed our time there.

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COMMUNITY COLLEGE SUPPLEMENT AWARDED

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leaders, are employed at least part-time (many full-time) and many community college students are parents. These higher levels of work and family responsibilities affect students' availability to serve as workshop leaders and to participate in workshop courses requiring an additional time commitment.

< Workplace and family emergencies cause absences from scheduled workshops.

< Most community college students enter college with a weaker academic background than their university counterparts, reducing the size of the potential leader pool.

Structural Barriers

< Relatively few community colleges have learning specialists and other similar professionals to assist new leaders and, as a result, lack the capability to carry out effective workshop leader training.

< Community college faculties typically carry heavier teaching loads than their four-year college counterparts, leaving them with less time to participate in leader training and to deal with implementation and adaptation issues.

Financial Barriers

< Community colleges often lack the resources to pay for student workshop leaders.

< Due to course transfer issues, few community colleges are able to offer academic credit to workshop leaders as alternative compensation.

< Community college faculties are less likely than their university counterparts to have funds available to them to attend professional conferences; consequently, dissemination of information about PLTL is more difficult.

The goal of the Initiative is to enhance the effectiveness of the National Dissemination Project by developing and implementing strategies to reduce barriers to PLTL implementation in the two-year community and technical college sector. To

achieve this, a leadership team from five institutions that have successfully implemented the PLTL Model in the two-year college setting has been formed. This team has structured a dissemination plan that parallels that of the parent Project and provides a supportive network to help community colleges to progress from initial interest to understanding, implementation, and leadership.

The plan's strategies and activities will:

- a. enhance communication with community colleges nationally to increase awareness of and interest in the PLTL Model. As part of this effort, PLTL curriculum materials and problems developed at leadership team institutions will be made available on the Project website;

- b. provide direct technical assistance and financial support to community college faculty seeking to adopt the PLTL Model in science or mathematics through enhancements to the Workshop Project Associate (WPA) program and through direct campus visits;

- c. provide presentations on PLTL to community college faculty and administrators through a series of regional one-day "drive-in" workshops at community college campuses;

- d. foster collaborative relationships, where appropriate, between two- and four-year colleges that will facilitate PLTL implementation at both institutions;

- e. provide workshop leader training to small, poor, and/or geographically isolated institutions that lack an internal capability to provide this critical component of the model through innovative means such as distance learning; and

- f. conduct a pilot program in New York City to determine the feasibility of expanding the PLTL Model to high schools through collaboration between community colleges and local school systems. This one-year effort will lead to a plan and a proposal for a full-fledged PLTL project at the high school level.

The Co-Principal Investigators are:

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Community college faculties typically carry heavier teaching loads than their four-year college counterparts, leaving them with less time to participate in leader training and to deal with implementation and adaptation issues.

Community college faculties are less likely than their university counterparts to have funds available to them to attend professional conferences; consequently, dissemination of information about PLTL is more difficult.

COMMUNITY COLLEGE SUPPLEMENT AWARDED

(Continued from page 15)

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For a schedule of the community college one-day

STAGES OF GROUP DYNAMICS

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cussion and asking talkative members to give others a chance, e.g., "Let's give Marie a chance to finish her thought."

Encouraging: making sure that relevant and necessary information is shared; this behavior is warm and responsive, e.g., "Before we make any decisions, Pete, could you tell us what you think about that?"

Harmonizing/Compromising: Smoothing over issues (harmonizing) or having everyone give in a little bit (compromising); these can be negative behaviors because their overuse can mask important issues and reduce group effectiveness. However, harmonizing relieves tensions and recognizes differences while compromising admits errors and modifies a position, e.g., "Let's reconsider Michelle's suggestion."

Self-Oriented Behaviors most often occur when the group is first forming, when participants are on a tight schedule, or when the task at hand is especially difficult; they create stress within the group. Such responses are detrimental to group dynamics:

Aggression: trying to raise status by criticizing or blaming, by showing hostility, or by deflating the ego or status of others in the group, e.g., "Aww, come on! You can do better than that!"

Blocking: interfering with the group's progress by going off on a tangent, bringing up topics unrelated to the problem, arguing too much on one point, or rejecting ideas without consideration, e.g., "Did anyone see the game last night?"

Seeking sympathy: playing the martyr, trying to get sympathy and support, e.g., "I just can't seem to do anything right for you guys."

Manipulating: introducing or supporting ideas that promote individual interests rather than the interests of the group, e.g., "Let's let Richard do it. I'll bet he's good at it."

Seeking attention: calling attention to oneself through loud or

extreme behaviors; disrupting the group's progress, e.g., "Hey, Terry! Come on over and say hi!"

Withdrawing: remaining passive, daydreaming, attending to anything but the work in progress.

Competing: trying to rival others in an effort to look more helpful in order to gain favor from group leaders, e.g., "Oh, I can handle any problem... !"

Task- and maintenance-oriented behaviors can be productive and necessary for creating a cohesive group, but self-oriented behaviors are disruptive and impede group progress. Peer leaders should be trained to reinforce, recognize, and model the first two behaviors which are necessary to ensure that the group stays on task and functions effectively. The third type should be avoided and discouraged.

As facilitators of groups, peer leaders need to know how to pull aside a student exhibiting self-oriented behavior and be specific in identifying the behavior, allowing time to respond. In many cases, leaders will find that this behavior is either an attempt to cover a lack of confidence in ability, or a feeling of being beyond the group in ability. Leaders should help students to identify positive behaviors, guided by the accomplishing and maintaining behaviors discussed above, benefiting both students and the groups to function well.

Linda Dixon

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References

Boatman, S. (2000) "Group Development" adopted from the LeaderShape Institute, LeaderShape, Inc. 2000.

Charrier, G.O. (1974) "Cog's Ladder: A Model of Group Development" adopted from The LeaderShape Institute, LeaderShape, Inc. 2000.

Pace, R. Wayne. (1983). Organizational Communication: Foundations for Human Resource Development. Englewood Cliffs, NJ: Prentice-Hall Inc.

EVALUATION OF DISSEMINATION EFFORTS

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shops were almost entirely framed in the context of 'How can we do it?' not 'Should we do it?' When asked what concerned them most about adopting peer-led team learning, participants hit upon a range of topics. But 99 percent of the responses were about implementation issues, not about whether or not to do it.

With regard to implementation, participants listed many potential obstacles and concerns. The following table shows a tally of concerns in different areas.

Concerns About Adopting PLTL

Institutional, departmental, and collegial support	27
Cost/Funding	23
Logistics and organizational arrangements	15
Time for all aspects of implementation	14
Recruiting and training peer leaders	11
Developing materials	10
Pedagogical fit/Student interest	8
Institutionalization	3

As the table indicates, support--from colleagues, the department, and the institution--was the area of concern most frequently mentioned. Participants in many cases seemed to feel isolated and unsure about whether they could gain the confidence of colleagues needed to introduce PLTL. This seems to be a valid source of anxiety based on the history of peer-led team learning and the experiences of those who have already initiated workshops. Closely related to this is the need for funding and uncertainty about its availability.

Some of the conferences included break-out sessions at which participants tried to develop a small set of materials for one or several workshops. What came through most frequently about materials is that they are idiosyncratic--to the discipline, the course level, the professor, etc. The concern voiced most frequently in written comments was about the time needed to prepare, revise, edit, and pilot materials. But some respondents said they were encouraged to find that materials do exist and can be adapted.

A major goal of the Dissemination Project is to introduce workshops in courses

other than chemistry. Participants were asked to name the disciplines in which workshops might be implemented. The following table shows the responses. Some participants listed more than one discipline. There may also be overlap because of participants from the same sites or departments.

In Which Courses Are You Considering Doing Workshops?

	<u>Miami</u>	<u>Pasad.</u>	<u>PR</u>	<u>Phila.</u>	<u>Portland</u>
Chemistry	14	8	5	4	10
Biology	14	6	5	6	6
Physics	6	-	4	1	3
Mathematics	3	-	5	-	9

Sixty-two percent of participants are considering implementing PLTL in courses other than chemistry, one of the goals of the National Dissemination Project.

Regarding the evaluation data presented, those attending the conferences generally found the comparative studies on student performance to be convincing. Some would have liked a more detailed description of the parameters and controls; studies that look at variables such as recitation vs. PLTL; impact on other courses; more detailed statistics; and comparisons with other innovations.

Respondents were highly pleased with the theoretical model based on Vygotsky's work which is used to describe the learning benefits inherent in the Workshop Model method. This presentation was not given at all of the conferences.

Attendees at some of the PLTL conferences were asked to indicate on a scale of 1 to 10 how close (10 = very close) they were to adopting the workshop approach. The table shows means of responses.

Close to Implementing PLTL (1 - 10)

<u>Conference Site</u>	<u>Mean</u>
Miami	5.7 (n = 21)
Pasadena	8.7 (n = 14)
Philadelphia	6.8 (n = 8)
Portland	7.5 (n = 33)

(Continued on page 18)

Support--from colleagues, the department, and the institution--was the area of concern most frequently mentioned. Participants in many cases seemed to feel isolated and unsure about whether they could gain the confidence of colleagues needed to introduce PLTL.

What came through most frequently about materials is that they are idiosyncratic--to the discipline, the course level, the professor, etc. The concern voiced most frequently in written comments was about the time needed to prepare, revise, edit, and pilot materials.

EVALUATION OF DISSEMINATION EFFORTS

(Continued from page 17)

At most of the conferences numerical ratings (1 - 5; 5 = highly effective) were used to indicate general satisfaction with the various presentations and other aspects of the conferences.

Average Ratings of PLTL Conference Topics

(By Conference Location)

	Pasad.	PR	Phila.	Portland	Avg.
The PLTL Model	4.5	4.9	4.6	3.9	4.5
Student Demo	4.6	4.9	4.5	3.9	4.5
Leader Training	4.0	4.8	4.1	3.5	4.1
Materials	4.2	4.7	4.5	3.2	4.2
Evaluation	3.3	4.8	3.9	3.4	3.8
WPA	4.8	4.8	4.5	3.6	4.4
Institutionalization	4.4	4.7	3.8	3.5	4.1
Breakout Sessions	4.7	4.7	4.5	4.0	4.5
Informal Interaction	4.6	4.7	4.9	4.3	4.6

The data from these four conferences, Pasadena (n = 14), Puerto Rico (n = 16), Philadelphia (n = 15), and

Portland (n = 37) indicate that experiences of individuals and groups vary, but the presentations are generally rated as highly effective.

More than 90 percent of the participants at the conferences thought the presentations on the PLTL Model were clear and that implementation was generally feasible. A common theme was, "I've seen that this method can be a very useful and effective tool."

It is clear that these conferences are achieving their goal which is to take faculty members who have some familiarity with the approach to a deeper understanding of the peer-led team learning method, and make it possible for them to take immediate steps toward implementation, with appropriate support. Actual implementation of PLTL is the next phase in dissemination.

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PLTL AT MADCP

The Mid-Atlantic Discovery Chemistry Project (MADCP) held its annual meeting in Selinsgrove, PA at Susquehanna University on June 5-6, 2000. Assistant Professor John Goodwin from Coastal Carolina University and three of his department's general chemistry workshop leaders, Therasa Pauquette, Arnold Forman, and Dwight Williams, attended the meeting and provided a demonstration of the chemical kinetics workshop (see Gosser, 1999. *Progressions*, Vol. 1, Issue 1). Nearly half of the meeting's sixty participants attended the presentation entitled "Adapting and Adopting Workshop Chemistry at Coastal Carolina University."

One highlight of the event was Professor Neil Potter's "Famous Chemistry Demonstration Show" in which Dwight Williams participated by holding an old-fashioned Coke bottle filled with hydrogen gas as Professor Potter ignited it. Coincidentally Dwight has worked part-time for the Coca-Cola bottling plant in Charleston, SC for several years. Dwight clearly knows how to work under pressure!

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PROMOTING METACOGNITIVE BEHAVIOR

(Continued from page 8)

shop but also how to make the method a meaningful learning experience as students articulate their ideas and learn to reflect on their problem-solving process.

Peer leaders serve an important role in helping students become more proficient in the discipline and more successful problem solvers. Leader training should include means to equip peer leaders in promoting metacognitive behavior. Reflective questioning and the pair problem-solving approach are two such methods that can be used to promote critical thinking behavior in the PLTL workshop.

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References:

- Herron, J.D. (1996). *The Chemistry Classroom*. Washington, D.C.: American Chemical Society.
- Rickey, D. and Stacy, A.M. (2000). *Journal of Chemical Education*, 77, 7, 915-920.
- Schoenfeld, A.H. (1985). *Mathematical Problem Solving*. New York: Academic Press.
- Whimbey, A. and Lochhead, J. (1986). *Problem Solving and Comprehension*. Hillsdale, NJ: Lawrence Erlbaum Associates

REPORT FROM FRANKFURT

The PLTL Workshop Project was represented at the 25th "Improving University Teaching International" (UTI) Conference, held at the Goethe University in Frankfurt, Germany, from July 17-20, 2000. The conference, *The Learner-Centered University for the New Millennium*, drew participants from around the globe, from Croatia to Malaysia. Topics included improving teaching and learning through staff development, sustaining an active learning environment, and critical thinking.

Vicki Roth, Assistant Dean, the University of Rochester, and Ellen Goldstein, Associate Director of the Center for Teaching and Learning, City College of New York, gave a two-hour workshop entitled *Peer Leader Training: A Model that Prepares Group Leaders for the Present*

and *Faculty for the Future*. Among the audience were faculty from Germany, the UK, Australia, and the US.

In discussion, it became clear that variations of the PLTL Model have been implemented in the UK. A recommendation of the 1997 Dearing Report on Higher Education (UK) promoted professional development of faculty members, which has led to the formation of the Institute for Learning and Teaching in Higher Education (ILT). Members of the ILT are now interested in comparing peer-led team learning models in the UK and the US.

The ILT website is <http://www.ilt.ac.uk/>

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WORKSHOP PROJECT ASSOCIATE GRANTS AWARDED

The new round of Workshop Project Associate (WPA) grants demonstrated the spread of PLTL into the newer disciplines of mathematics and physics, joining biology and chemistry. Further details of the awards are provided on the PLTL Project website.

Central College Glenn Barnett	<u>Biology</u> Discipline: Introduction to Cells Peer Leaders: 6
San Jose City College Beth Gaydos	Discipline: Biology Peer Leaders: 4
Allegheny College S. Shaun Murphree	<u>Chemistry</u> Discipline: Organic Chemistry Peer Leaders: 10
Central College Louise Zaffiro	Discipline: General Chemistry Peer Leaders: 10
Eastern College Anna Cavinato	Discipline: Chemistry Peer Leaders: 4
Ohio University Lauren McMills	Discipline: Chemistry Peer Leaders: 5
	<u>Mathematics</u>
Eastern Oregon University Kay Firor (Math 095) Kaz Marlette (Math 011) Anna Maria Dill (Learning Specialist)	Discipline: Mathematics Peer Leaders: 16

Prince George's Community College Peggy Beck	Discipline: Mathematics Peer Leaders: 3
	<u>Physics</u>
University of Oregon David Sokoloff	Discipline: Physics Peer Leaders: 3

PEER-LED TEAM LEARNING WORKSHOPS: SIX CRITICAL COMPONENTS

- ? The Workshop is integral to the course.
- ? Course professors are involved in the selection of materials, training and supervision of peer leaders, and they review the progress of Workshops.
- ? Peer leaders are selected, trained, and supervised to be skilled in group work as facilitators.
- ? Workshop materials are appropriately challenging, directly related to tests, designed for small group work.
- ? The Workshops are held once a week for two hours, contain six to eight students per group, in space suitable for small-group activities.
- ? PLTL is supported by the department and the institution with funds, course status and other support so that the method has the opportunity to be adopted across courses and disciplines.

Progressions: Peer-Led Team Learning is a quarterly publication of the Workshop Project.

Progressions is intended to build the Workshop community by telling the stories of adoption of the Workshop Model at institutions of learning. It also will provide useful examples of materials that have been successful, and is intended to be a forum for what works in leader training.

The editors are looking for contributions: please contact us with special concerns you would like addressed, have a presentation or workshop to announce, or an article that others would find interesting.

The Workshop Project Newsletter

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HOT OFF THE (PRENTICE-HALL) PRESSES!

Prentice Hall has published PLTL Workshop materials, as part of its series in Educational Innovation (EI), supervised by John Challice, Senior Editor. The newly-available materials are:

Peer-Led Team Learning: A Guidebook: David Gosser, Mark Cracolice, Jack Kampmeier, Vicki Roth, Victor Strozak, and Pratibha Varma-Nelson.

Peer-Led Team Learning: General Chemistry: David Gosser, Victor Strozak, and Mark Cracolice.

Peer-Led Team Learning: Organic Chemistry: Jack Kampmeier, Pratibha Varma-Nelson, and Donald Wedegaertner.

Peer-Led Team Learning: General, Organic and Biochemistry (GOB): Pratibha Varma-Nelson and Mark Cracolice.

Available February 2001:

Peer-Led Team Learning: On Becoming a Peer Leaders: Vicki Roth, Ellen Goldstein, and Gretchen Marcus.

For more information check the Prentice Hall website at <http://vig.prenhall.com/> or the PLTL website.

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