

# PEER-LED TEAM LEARNING DISSEMINATION

## PLTL MEETS POGIL AT MADCP

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As every scientist knows, the most important thing you learn in an investigation often isn't at all what you thought you were going to learn: it is something totally unexpected. Such was the case for us at the June 2004 meeting of the Middle Atlantic Discovery Chemistry Project (MADCP).

The trail begins at the 2003 PLTL National Leadership Conference, held at the City College of New York on October 9-12. This conference included a well-received workshop by Jim Spencer of Franklin and Marshall College entitled "POGIL Meets PLTL: The Use of Process-Oriented Guided Inquiry Learning in Workshops." Jim is one of the creators of POGIL, and that he would be invited to speak makes perfect sense because POGIL and PLTL share many of the same goals and some of the same approaches. Jim took the opportunity to present the participants with an overview of the POGIL methodology, which follows a learning cycle paradigm, to conduct a POGIL workshop, and to discuss the possibility of using or adapting the POGIL materials and the POGIL approach to a PLTL workshop setting.

In November 2003 Rick Moog, another of the architects of the POGIL approach, sent a message to recent MADCP participants, asking if we were willing to make a presentation or to run a workshop at the 2004 MADCP meeting. For the authors of this article, the decision was a no-brainer: we each wanted to present something on PLTL. One of us suggested a mirror image of Jim's workshop: "PLTL Meets POGIL." It seemed clear that the MADCP conferees, largely adherents of POGIL, would be interested in learning more about PLTL for exactly the same reasons as users of PLTL were interested in learning more about POGIL. When Rick began putting the MADCP program together in March 2004 he noted that since we had similar presentation interests, perhaps we would be able to work together to whip up a pair of three-hour sessions on PLTL. Both of us were open to this suggestion, and we looked forward to the collaboration. But how would we fill three hours?

Tom E., who had recent experience in presenting Multi-Initiative Dissemination (MID) Project workshops for PLTL thought, "The first two hours will be easy...we'll just do what we'd do at a MID workshop." Tom B., who has a keen interest in demonstrating the applicability of PLTL in as many disciplines as possible, suggested that to fill the remaining time we could also create and run a PLTL-style Workshop of our own. We would choose a topic of mutual interest, but also one having nothing to do with chemistry, so that we could truly demonstrate for the participants just how broadly applicable the PLTL methodology is.

We batted around a number of topics. Music theory? (Tom B. plays the flute and Tom E. the bass guitar.) A PLTL Workshop on PLTL itself? (Obviously we both have an interest in that.) We settled on "Options Trading" – as in stock options – since we both have had a little experience in this area

and we were fairly certain that only a small fraction of the participants would know anything about this. If our hypothesis were true, people who knew essentially nothing about options trading would come in the front end of the workshop and, through the magic of PLTL – voila! – newly indoctrinated options traders would emerge from the other end.

Tom B. produced a draft shortly after the end of the spring semester, and we spent considerable time over the next month refining the “Options” Workshop. The questions were set up to build on the attendees’ knowledge of the finances involved in the sale of a house purchased as an investment. We felt everyone would be able to identify with this analogy to stock options trading, even if they knew nothing about the stock market. A brief description of the background was given, followed by specific suggestions for the process to be followed (“think-pair-share” in some cases, “group round robin” in others) in negotiating a mutual understanding of the meaning of their answers to the subsequent questions. We worked hard to fin-tune the problem set, producing what we thought was a clear, coherent, and compelling series of questions that would guide the participants to an understanding of something about which they had previously had little or no knowledge. The final version of the Workshop covered topics of investment property, “call” options in stocks, “put” options, and finally, short sales. We were sure we were ready to go.

On the morning of June 6, 2004 we emerged from our dorm rooms at the Mt. Vernon campus of George Washington University (Washington, DC), arms filled with handouts and published materials from Prentice Hall to share with the workshop participants. Although we knew they had come to the conference mostly to hear about guided inquiry (GI) methods, we were confident that they would enjoy finding out more about another collaborative learning technique with proven benefits.

We began the session with a two-question “cryptic survey,” asking – without explaining our intentions – how much they felt they knew, on a scale of 0 to 10, about (1) the stock market, and (2) options trading. The purpose of this paper-and-pencil survey was to determine who might best function as “Leader for a Day” when it came time to run our “homemade” Workshop. We wanted to give at least a few people the experience of being a peer leader (to the extent that this was possible under the circumstances), and we thought that the people who ranked themselves most highly on this survey would make ideal leaders. Simultaneously, we didn’t want these “ringers,” if there were any, giving away all the answers to the members of their group.

After completing the survey, the participants broke into pairs for an icebreaker. We asked them to interview each other, finding out their partner’s name and area of specialization, how long they had been teaching, why they came to the MADCP conference, and what they hoped to get out of the PLTL session. Each person then introduced his or her interviewee. The participants came from all chemistry sub-disciplines: physical chemistry, biochemistry, organic, analytical, environmental, materials science, chemical education, and high school chemistry. There were graduate students, and there were folks with forty years’ teaching experience (the average was 14 years). People had come to the conference to learn how others were using GI methods in their classes, to learn new approaches for active learning, to meet new people, to get ideas for upper division courses, to find ways to motivate non-science majors, and because they were dissatisfied with the traditional lecture format for teaching. They came to our session because they knew a little about PLTL and were curious to learn more, or they wanted to know if PLTL was right for them, or because they wanted to contrast POGIL with PLTL, or because they were ready to adopt PLTL and just needed additional

information. We listed their interests and concerns on the board in front of the room, and left the information there so we all could refer back to it: for us to shape our comments to fit the participants' stated interests, and for them to decide as we went along if the session was filling their needs. We also listed some of the important similarities and differences between the PLTL and POGIL approaches.

We wanted to get the participants involved in *doing* workshop chemistry as early as possible in the session, so we gave only a very brief overview of the essential features characterizing PLTL. Participants were given a handout with all the slides we would show that day, so they would not have to waste time scribbling down everything that appeared on the screen. But before beginning our first workshop, we gave one more handout – a series of questions for them to answer as the session went along, to try to get them thinking about some of the key elements of the PLTL process:

- What is the model peer leader doing during the workshop?
- What do the students have to do to make a PLTL session work?
- In preparing materials for a PLTL Workshop, what would a faculty member have to do to ensure a successful experience?
- Are PLTL Workshops appropriate for qualitative questions, quantitative, or both?
- Do you think that PLTL will enhance student understanding?
- What skills are learned in a PLTL environment?
- What are the advantages (if any) of straight lecturing over PLTL?

Over the next 45 minutes, we served as the “peer leaders” while the participants – now divided into groups of three or four – went through an abbreviated version of the “Chemical Kinetics” Workshop (Gosser, et al., 2001). This exercise has been used with great success in MID Project workshops, and in other “Introduction to PLTL” settings. The Workshop deals with first-order kinetics for both irreversible and for equilibrium reactions. The kinesthetic aspect of this Workshop – the physical process of actually moving the pennies – makes it particularly appealing, and particularly effective at driving home what might otherwise be abstract concepts. [Note: A version of this workshop is available under *Dissemination* at [www.pltlis.org](http://www.pltlis.org).]

Now suitably familiarized with the format of a typical PLTL Workshop, the MADCP participants were given a more detailed description of PLTL. We wanted them to have enough background to get started if they had been sufficiently tantalized. Helpful information was provided about the PLTL website; how to get administrators and staff involved and interested; physical space needs for running workshops; and various models for leader selection and (especially) leader training. Copies of the Prentice Hall PLTL series were distributed to each participant, and then we took a ten-minute break.

During the break some participants jotted down answers to the questions we had posed earlier. We pulled aside the two people who had ranked themselves most knowledgeable in terms of the stock market and options trading, and gave them very brief instructions as to what it means to be a peer leader: don't give answers to questions; answer questions by asking questions; guide your students' thinking by reminding them of what they already know; and so forth. We quickly reviewed the basic ideas incorporated in the “Options” Workshop, and gave these “Leaders for a Day” a few minutes to review the Workshop itself. Then we reconvened the groups.

After a few minutes of further discussion on the basics of PLTL – the benefits of active learning, the theoretical basis for why PLTL works (Vygotsky and the “zone of proximal development”), and an expanded version of the six critical components of a successful PLTL program – we were ready to start. We reminded participants that this was a work in progress. We cautioned them that they should not feel “dumb” if they didn’t understand all the terminology in the Options Workshop. We let them know that they should expect to be a little confused and frustrated, at least at the outset. And then we let them get down to business.

We thought we had worked sufficiently hard to produce a series of problems that, while not exactly child’s play, would still be doable by the vast majority of the participants, especially with the aid of their group members, and with facilitation provided both by us and by the “Leaders for a Day.” But the participants’ over all reaction was decidedly different from their earlier, favorable response to the Kinetics Workshop.

Of course, no one but a sadist wants to know he is responsible for the suffering of others. As the Options Workshop wore on, people were clearly suffering, and frustration showed on many faces. We felt bad; we wanted them to learn, but it didn’t seem to be working. To be fair, some of the participants made progress, but others didn’t, and the ones who didn’t were not happy about being put in that position.

In retrospect, this shouldn’t have surprised us too much, because it’s not very different from the reaction we get to PLTL workshops when we first introduce them each semester in our classes. Students realize that they are responsible not only for doing all the work to solve workshop problems, but also that they are not going to be given very much help, or the answers, or even told whether or not they have solved the problem. Our students are not happy about this at first, but it helps when they hear that people who have been through PLTL workshops do much better in the course than those who haven’t. This holds them until they see proof of it by performing much better than they expected on their first exam.

Many of our MADCP participants were not so easily assuaged. Finally, near the end of the time we had allotted for this portion of the session, one of the participants asked, somewhat peevishly, “What is the *point* of this exercise?”

We wish we could have come up with some more compelling or erudite answer, but all we had was the simple truth: “We wanted to demonstrate that PLTL could be used for teaching in *any* discipline, not just science.” But instead, perhaps, all we did was to demonstrate just how frustrating it can be for our students to find themselves in a situation where they don’t understand anything, don’t feel like they’ve been given the necessary background to understand it, and don’t feel like they possibly could understand it. We were left wondering if perhaps we should have picked “music” as our non-chemistry topic.

Fortunately, another of the participants pointed out the true benefit of their experience with this Workshop more explicitly: “We are getting a chance to feel what our chemistry students must feel like when first attempting PLTL Workshops.” We realized that *this* lesson – the frustration of beginning students, a frustration that we don’t always recognize – was the important lesson of the session, much more so than anything the participants might have learned about options trading, or even about the extensibility of PLTL to other disciplines. And the fact that one of the *participants* had

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said it allowed the group to finish their work on the Options Workshop with at least a modicum of good feeling.

Slightly disappointed, but certainly not defeated, we wrapped up the session with data, both our own and others', demonstrating the effectiveness of PLTL in terms of improving grades and, importantly, in terms of increased persistence through difficult courses. We showed graphs illustrating the PLTL implementation explosion that has occurred over the past five years, with respect to exponentially increasing numbers of students, instructors, institutions, learning specialists, and disciplines using PLTL. We discussed the long-term benefits of PLTL to the students and to peer leaders. To help people get started with a program of their own, we passed out documentation PLTL from the MID Project, including an overview, a summary of web-based information, additional statistics attesting to the effectiveness of the method, and a list of published materials from Prentice-Hall. Samples of the Guidebook and the published workbooks were available for each participant who wanted one. Participants expressed gratitude over the availability of these materials, and we are indebted to Prentice-Hall for making them available to us free of charge.

We felt a little better when, after the session had ended, one of the participants approached us saying, "Don't worry. You guys didn't do anything wrong by trying this. It helped quite a bit." For the second session, (June 8th) we were much more circumspect about warning the participants of the potential for frustration, and things went more smoothly.

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### References

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