Peer-Led Team Learning: Evaluation, Dissemination, and Institutionalization of a College Level Initiative

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Peer-Led Team Learning: Evaluation, Dissemination, and Institutionalization of a College Level Initiative

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Introduction

There seems to be no end to the flood of conferences, workshops, panel discussions, reports and research studies calling for change in the introductory science courses in our colleges and universities. But, there comes a time to move from criticism to action.

In 1993, the Division of Undergraduate Education of the National Science Foundation called for proposals for systemic initiatives to change the way introductory chemistry is taught. One of the five awards was to design, develop and implement the peer-led Workshop, a new structure to help students learn science. This book is a study of 15 years of work by the Peer-Led Team Learning (PLTL) project, a national consortium of faculty, learning specialists and students. The authors have been in the thick of the action as project evaluator (Gafney) and co-principle investigator (Varma-Nelson).

Readers of this book will find a story of successful change in educational practice, a story that continues today as new institutions, faculty, and disciplines adopt the PLTL model. They will learn the model in theory and in practice and the supporting data that encourage others to adopt and adapt PLTL to new situations. Although the project has long since lost count of the number of implementations of the model, conservative estimates are that more than 100 community and four year colleges and a range of universities have adopted the PLTL model to advance student learning for more than 20,000 students in a variety of STEM disciplines.

This book is more than just a record of the PLTL story. Throughout, the authors distill out lessons of broader significance. For example, the six critical components for successful implementation of PLTL are pertinent to all efforts to effect educational change. The authors' analyses extend beyond local implementation to offer tactics for national dissemination and to suggest critical components of successful institutionalization of new pedagogies.

PLTL is a part of a significant shift in educational practices to provide new opportunities for student-centered active learning and the authors carefully situate PLTL in that larger context of change. On the other hand, PLTL is distinguished from many other initiatives by the central role of the peer leader. PLTL defines a new partnership with the faculty and staff and a leadership role for undergraduates that is appropriate to their abilities, while providing unprecedented opportunities to

develop new levels of understanding of the discipline, and important teamwork, leadership, communication and interpersonal skills. When these gains for the leaders are added to those experienced by the students in the peer-led Workshops, the sum is a two-for-one result and compelling reason to pay attention to this insightful book.

Jack A. Kampmeier
University of Rochester

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Chapter 1
Plan and Context of the Study

1.1 Background

Peer-Led Team Learning (PLTL) is an instructional model (http//www.pltl.org) that advances student achievement through active learning in a peer-led workshop (Varma-Nelson, 2006). During the past 15 years the method has demonstrated its effectiveness, improving students' academic performance in more than 20 studies. Conservative estimates are that PLTL is now used in more than 100 institutions—four-year colleges, community colleges, and research universities. More than 20,000 students, 150 professors, and 1,500 peer leaders are engaged in PLTL workshops each year, as an important part of their science courses. This study has grown out of more than 10 years of careful evaluation and monitoring of PLTL, and will provide detailed information, data, and references for all aspects of the project.The PLTL newsletter, *Progressions*, contains a wealth of information about the development and implementation of the project, and is available on the project website.

In a typical workshop, six to eight students meet with a peer leader for one and a half to two hours per week to discuss topics and solve problems that reinforce lecture and textbook learning, while also deepening their conceptual understanding and critical thinking. The workshop problems and activities are constructed to reinforce these goals and provide relevant applications. Most importantly, the workshops stretch students to work beyond what they could accomplish individually, so that through cooperative activities and appropriate guidance from the leader they reach new levels of understanding and performance. As students become more involved and engaged, they accept more responsibility for their learning and as a result their academic performance improves. The *PLTL Guidebook* (Gosser et al., 2001) explains the program, its theoretical foundation and offers practical advice for implementation.

The workshops are integrated into the course so that students can discuss their understanding of the concepts presented in the lectures and textbook in a non-threatening environment. Peer leaders facilitate the workshops, clarify goals, ensure that the team members engage with the materials and with each other, and they provide guidance as needed in solving problems. The process encourages collaboration and builds confidence. The leaders are students who have previously done well in the course and exhibit good communication skills and leadership potential. The workshop leaders

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play an essential role because they are recent learners of the material. They relate to the students in the group as peers, understand how they learn, and explain material in ways that connect with them (Gosser & Roth, 1998). They are generally not responsible for grading student work, because it is important that they act as role models rather than authority figures. Unlike graduate teaching assistants, they have generally studied with the same instructor and from the same textbook as the students in their workshops.

Taken as a whole, the PLTL method forms a new pedagogy and consequently required careful monitoring and evaluation. The evaluation of PLTL was collaborative. Gafney, the external evaluator and co-author of this study, developed a theoretical framework for the overall evaluation, prepared instruments, studied implementation, identified outcomes, analyzed data, and prepared reports on various aspects of the project (Gafney, 2001a). The faculty members cooperated with the activities initiated by Gafney, collated and analyzed survey data and also conducted grade-based and standardized test-based studies of student performance (Tien et al., 2002; Wamser, 2006). Results of these studies will be presented in Chapter 2.

The first phase of the evaluation incorporated an approach similar to that described by Chen (2005) who identifies three stages of evaluation: analysis of implementation, monitoring by practitioners, and study of outcomes. In the evaluation of PLTL, implementation was analyzed using focus groups, questionnaires, and interviews to gather data about the project as the founding group of faculty began to use the method. Then the same faculty implementers and learning specialists (generally directors of learning assistance centers) monitored the program's progress at their institutions. They were primarily interested in student achievement of traditional learning goals measured by grades, and by the impact of the program on the peer leaders. This program monitoring also fostered increased faculty ownership, an interest in pedagogy, and a deeper understanding of PLTL-related issues, including an appreciation of the benefits of involving student leaders as partners in the educational enterprise. In the next phase, Gafney analyzed PLTL outcomes across sites, comparing implementation strategies, identifying problems, and analyzing how adoption of PLTL workshops interacted with departmental and institutional cultures.

In addition to being collaborative, the evaluation was multidimensional, looking beyond student performance, to consider each of the following: quality of initial implementation, the effect on leaders, and adaptation issues by type of institution and discipline. The evaluation also studied dissemination of the method particularly through mini-grants. Finally the requirements for institutionalization were studied.

1.2 Plan of the Study and Methodology

This was a broad-based study. The goal was to look closely at implementation, dissemination, and institutionalization in order to identify key factors that would be transferable to other educational innovations. The study considers three evaluation questions: (1) What is required for a new approach to teaching and learning to be

successfully implemented at the college level? (2) What is required for dissemination of the method across disciplines and institutions? (3) Finally, what are the critical elements needed to successfully institutionalize a program?

This study therefore has several parts. First, how is a model for teaching and learning developed and tested? Peer-led workshops are embedded in theories of learning and ideas about instructional practice, but they are also rooted in the cultures of departments and institutions. Workshop programs were developed, piloted, assessed, and revised. But this did not happen in a vacuum. Institutional and professional priorities had to be addressed and this led to modifications. We found that the type of institution, the discipline, and previous history were significant factors in the implementation and in the success or failure of PLTL at each site.

The second part of the study looks at dissemination issues from the perspectives of the disseminators and of the recipients. The PLTL project developed a four-tier model that proceeded from creating initial interest in the method, to assisting with implementation, and exploiting dissemination opportunities. Peer-led workshops were adapted to local circumstances and needs, and frequently were introduced with other new approaches to teaching and learning. These adaptations introduced other variables but they also made the results more interesting and valuable.

The third part of the study identifies critical success factors required for the institutionalization of PLTL. We began with a set of hypotheses that included: adherence to the model, fit with local needs, and administrative support. We found that these were important but data analysis uncovered other important sustainability factors related to faculty cooperation, motivation, and adaptation of the model.

The three parts of the study just described are covered in Chapters 2 on implementation, 3 and 4 on dissemination, and 5 on institutionalization. Chapter 6 presents the results of a careful study of the impact of PLTL on peer leaders, as they looked back on the experience from the vantage point of up to 10 years. Chapters 7, 8, and 9 treat particular areas related to the program—under-represented minority students and women, new paradigms for teaching and learning, and special issues.

Results of the evaluations are presented in various parts of this study, as appropriate. In Chapter 10 they are collected and reviewed with suggestions for adapting them to other projects. It is important to note that the strategies used and data collected grew organically out of the project, as it evolved over the years and grew in complexity. Methods used in this study included the following.

- *Surveys*. Since the first years of PLTL, surveys have been employed with students, faculty, and peer leaders to gather information about their experiences and their satisfaction with the program. An online survey with former leaders was used to gather data about the impact of leading workshops on the leaders' further studies and first career steps. Another online survey of PLTL faculty was used to gather data about the perceived success of PLTL, dissemination activities, and institutionalization.
- *Interviews*. Over the years of the PLTL grants, interviews have been conducted with the students, peer leaders, faculty, and administrators to gather information about experiences with the program, problems in implementation and dissemination,

the effectiveness of workshops, benefits to students, and other important issues such as funding. These interviews have generally been semi-structured, with the same questions being asked of a population of faculty, students, or peer leaders, but with room in the interview to pursue areas of individual interest. Interviews have generally lasted about 30–40 minutes, were recorded, transcribed, coded according to need, and analyzed.

- *Focus groups and discussions with workshop students and leaders*. Discussions with those engaged in workshop learning provided a rich source of insights into the perceptions of students about their own learning as well as the academic, social, and motivational impact of workshops on students.
- *Comparative studies and other statistical measures*. Instructors using PLTL have collected grade data based on students in classes with and without workshops. They have also collected scores from standardized tests for cohorts with and without workshops. Some instructors have determined the impact of workshop attendance, comparing numbers of workshops attended with grades.
- *Review of the literature on learning and academic support programs*. Both Gafney and faculty members associated with the project have studied the literature surrounding peer-led workshops. Insights into learning theory, pedagogy for small groups, developmental stages, student diversity, other reform initiatives, and dissemination have been important in assessing the progress and potential of PLTL.
- *Site visits*. During the years of the project and as part of the supplemental grant on dissemination and institutionalization, the project evaluator, Gafney, made numerous visits to PLTL sites, interviewing faculty and leaders, observing workshops and talking with students to identify the keys to successful implementation, dissemination, and institutionalization.
- *Participant observations*. One of the authors, Varma-Nelson, has given numerous workshops for faculty members, as well as formal presentations at conferences and seminars throughout the United States and in several foreign countries. These experiences have yielded insights into the issues and problems associated with adopting, adapting, and implementing workshops.
- *Administration and data collecting related to mini-grants*. Varma-Nelson was the administrator of 92 mini-grants to PLTL adopters. The applications for these grants, reports submitted, and responses to phone interviews and site visits yielded a wealth of data about all three areas of the study: implementation, dissemination, and sustainability. We also gained a deeper understanding about the use of mini-grants as a dissemination strategy.

1.3 Origins and Rationale for Peer-Led Team Learning

The organizational arrangements surrounding college-level science courses are well established. Lecture hours, textbooks, quizzes and exams, supplemented in some cases by labs and recitations, define most courses. The assessment methods

define what students focus on. There is, of course, variety in lectures and in textbooks. Some professors are clearer, more interesting, and bring the material to life more than others. Students, however, often find themselves more passive than active in lectures.

A number of teaching/learning problems encouraged the founding group of instructors to try Peer-Led Team Learning. Among these were:

1. Professors of chemistry at the participating institutions described how general and organic chemistry had changed in recent decades. Students are now required to engage in material that is more conceptual, quantitative, and challenging than in the past. Whereas memory once sufficed in passing science courses, these professors pointed out that rote memorization no longer works. Students have to understand concepts in order to solve problems.
2. Professors at many institutions find that even successful students frequently do not know how to communicate scientific ideas or work on problem solving teams.
3. Many students do not seek the help they need nor do they utilize the on-site resources available to them.
4. A large number of students are not actively engaged in their own learning. Faculty members recognized and accepted the fact that the handing down of knowledge must be complemented by individual and social learning activities that promote intellectual and personal growth. They also saw that many students were simply not "getting it," in lectures. They were therefore looking for approaches that would supplement lectures, requiring students to be more intellectually active.

In addition to these personal experiences and reflections, the project is supported by the literature on why students are challenged and why many leave the sciences. Studies point to a range of reasons for attrition. First, according to some, there is a tendency on the part of faculty—implicit or explicit—to blame students for their failures (Lovitts, 2001). These studies indicate that a variety of factors beyond student effort and achievement are involved and should be considered. Tobias (1990) described differences in the way minority students tend to approach learning and the fact that many pedagogical innovations are of particular benefit to these students. Seymour and Hewitt (1997) provided evidence that many students leave the sciences because of problems, "which arise from the structure of the educational experience and the culture of the discipline" (p. 392). These problems are related to, "pedagogy, student assessment, curriculum design and advising" (p. 394).

Astin and Astin (1993), in a major longitudinal study of more than 27,000 students, found that adequate preparation in mathematics was the single best predictor of students persevering as science majors and entering science-related careers. In a related study, Astin (1993) concluded that "the student's peer group is the single most potent source of influence on growth and development during the undergraduate years" (p. 398).

The PLTL founding group saw that many of the concerns outlined above could be addressed by supplementing their lectures with PLTL workshops. Students would spend more time problem solving, become more active in their learning, communicate more effectively with one another, review the lecture material, have