PEER-LED TEAM LEARNING IMPLEMENTATION

INCORPORATING PLTL IN A PHYSICS COURSE: AN EVOLUTION AT THE UNIVERSITY OF MAINE

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Algebra-based introductory physics at the University of Maine, Orono, had undergone a transition starting in 1997, in which small group tutorial work replaced instructor-centered problem-solving during the recitation meetings. University of Washington material was used and some new tutorial materials were researched and developed. The instructor's role changed from classroom authority to facilitator engaging students in semi-Socratic discourse.

The Physics Education Research Laboratory at the University of Maine initially became interested in Peer-Led Team Learning (PLTL) after David Batuski, a physics faculty member (along with Rebecca Eilers, Dean of the College of Liberal Arts and Science (CLAS), and Mitchell Bruce, chemistry faculty) attended a PLTL conference in Miami in January 2000. Initially an internal grant funded by CLAS enabled Stephen Kaback, instructor for the algebra-based introductory physics course, to support four peer leaders for the Spring 2001 semester.

Assessment Study, Spring 2001

Side by side comparison data of tutorial sections with instructor and peers vs. instructor alone showed no difference in exam averages over four exams (data normalized).

Implications of research suggested that interactive engagement (IE) may be at the root of more meaningful student learning. A comparison of sections with peer leaders to sections without (but still doing IE activities) showed no difference in student performance in comparison studies between IE v. traditional instruction.

Changes to implementation of peer led workshops (funded by a Workshop Project Associate grant) included:

1. a longer training period each week for the peer leaders (peer leaders develop a higher level of content mastery);
2. emphasis on the role of the peer leaders as a resource and guide, but NOT an authority;
3. longer time dedicated to training in team dynamics;
4. facilitation training for specific parts of the tutorials.

In the training sessions, peer leaders and graduate TA's work together covering the material in the same way the students will be doing in the following week. Batuski, Kaback, and Michael Wittmann acted as facilitators to model appropriate facilitation strategies for the peer leaders and instructors.

Assessment Study, Fall 2001

Again, research was set up as side-by-side comparisons between instructor and peer leader tutorial sections v. instructor-only sections using exam averages of four exams as assessment criteria. The data showed an absolute difference between the exam averages of the three sections with peer leaders and the two without. More closely analyzed data identified some interesting results; of particular interest:

1. The absolute difference between PLTL and non-PLTL sections in Fall '01 was an improvement over the complete parity between the groups in the previous semester, Spring '01. Although we had five sections of algebra-based introductory physics participating in the study, our comparison between two sets of two sections (two in control group [no PLTL] and two in treatment group. [PLTL]; n = 84), showed an increasing difference in exam scores favoring PLTL as the semester progressed. This maxed out at a four- point higher average score for PLTL sections by the third (of four) exams.
2. One PLTL group with a much lower incoming math GPA (our means of profiling group aptitude) started off doing comparably to all other groups on exams but ultimately performed at the lowest level even with peer leaders available to the section. We are investigating possible reasons for this phenomenon (it may be just an anomaly).
3. In tracking student performance over the year, we found a very significant difference in exam performance in the second semester of the course. Although all students had peer leaders for the Spring '02 semester, those who had already had peer-led workshops in Fall '01 scored up to an average of nine points better on exams than students participating with peer-led workshops for the first time. We will see if this effect persists in this upcoming academic year.

Qualitative Assessments

Students are more satisfied with the peer leaders as indicated by solicited and non- solicited comments. Observations in tutorial section meetings demonstrated a qualitative improvement in student-peer interactions and peer-instructor interactions. Quantitatively more team meetings are occurring outside of class with more students per peer leader (although the number of meetings and students attending typically increase as the time before the next exam decreases). There is a continuing interest in:

1. A refinement of our understanding of the peer leaders' role. There is an impact on student learning when peers are present during small group work. We are trying to isolate factors that make peer leaders work or not work toward improved learning;

2. Influencing science and math majors who are participating in the peer leader project toward teaching as a career possibility. Student leader surveys (n=15) indicate that students who had not considered teaching are now considering it after experiencing "the other side of the fence."

In the face of a serious math and science teacher shortage, we are interested in the potential for PLTL to act as a medium to funnel good students toward education. Some peer leaders already anticipated teaching after college; others not. Of the ten students in the "not" category, three have indicated that they are now considering teaching as a possible part of the career trajectory.

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