DEVELOPMENTAL MATHEMATICS:

MTH 3 (ALGEBRA I) INTERVENTIONS: Peer Led Team Learning

Executive Summary

This intervention shows great potential and is targeted as one to be continued at the College.

Development and Implementation

The developmental math faculty did extensive research to find innovative strategies which have proven successful with Algebra students. Two faculty found out about Peer-Led Team Learning (PLTL) at a math conference. PLTL is small group, highly interactive work facilitated by a peer leader. Subsequently, one math faculty traveled to City College of New York for two days of training. At the beginning of implementation, an off-campus consultant conducted a full day of training for all faculty, staff, and peer leaders who would be involved in the program. Since then, a two-hour training session is conducted prior to the beginning of the semester, with one hour training conducted each week.

The PLTL sessions were named the "Power Hour," and the hour was built into the schedule one day a week, just prior to the regular Friday class. That hour is always open to the students, due to the way the classes are scheduled. Attendance at the Power Hour is voluntary, although students are given incentives to attend, such as extra credit points. The PLTL Power Hours sessions were begun Spring Semester, 2007, and they have continued both fall and spring since then. Each semester, two Algebra I classes have been chosen to have PLTL "Power Hour" sessions. Three peer leaders are assigned to each class, and the class is divided into small groups, which meet at different locations throughout the campus. The peer leaders attend one hour of class on Monday and Wednesday and conduct the Power Hour sessions on Friday.

Because the college already has a successful TRIO tutoring program, the PLTL leaders work under the direction of the tutor coordinator of the TRIO program, and Lumina funding for the faculty and peer leaders is funneled through the TRIO program.

Findings

PLTL was first piloted in the spring of 2007. Student outcomes in the PLTL sections were very positive. One factor which may be associated with this initial success may be the high quality of the PLTL student leaders. Maintaining enough peer leaders is an issue discussed below. Two of the five day sections of MTH 03 in the fall of 2007 piloted Peer Lead Team Learning. Based on student survey responses, and the relationship between attendance at PLTL and their success in the course, these sessions were beneficial. Overall course success was not evident due to many of the students in the course not taking advantage of the PLTL sessions.

Table Showing Outcomes

Student Outcomes for Math 3 Sections, Spring 2007
(This was the first pilot of Peer Lead Team Learning)

Formats	# of Students	Pass Rate (S grades)	Withdrawals (W grades)	Fall GPA	Credit Hrs Pass Rate	Spring to Fall Retention
PLTL	47	49%	17%	2.13	54%	70%
Non-PLTL	26	27%	19%	2.04	41%	65%
Fast-Track	10	60%	30%	2.74	72%	80%
Night	13	62%	38%	2.40	63%	62%
Web	27	19%	33%	2.27	41%	70%

Power Hour for Peer Lead Team Learning, Developmental Math 3 – Algebra I, Spring and Fall 2007 (57 responses)

Statements	Strongly Agree	Agree	Strongly Disagree	Disagree
The Power Hour each week was very helpful.	76%	24%		
I believe my math grade will be higher because of my participation in the Power Hour.	59%	41%		
I felt very comfortable having a student as my Peer Leader.	62%	38%		3%
I felt the Power Hour with a group of students helped us to learn from each other.	55%	45%		
I would recommend to students needing assistance with math that they participate in the Power Hour.	85%	15%		
My primary reason for participation in the Power Hour was the bonus points.	23%	41%	15%	21%
My primary reason for participation in the Power Hour was to get assistance with math.	55%	45%		

Blank page/formatting problems, continue below!!

Developmental Math 3 – Algebra I
Experimental Teaching Methods - Fall, 2007

Table 1. Student outcomes for Math 3 Day Sections, Fall 2004 – 2007

Fall Term	Number of Students	Pass Rate (S grades)	Withdrawals (W grades)	Fall GPA	Credit Hrs Pass Rate
2004	129	36%	24%	2.31	53%
2005	115	37%	19%	2.25	54%
2006	127	41%	19%	2.06	50%
2007	115	46%	8%	2.05	56%

Table 2. The use of new teaching methods in three, day sections of Math 3

Sections	Collaborative	PLTL	Manipulatives	Navigator
1		X		X
3	X	X	X	
4	X		X	
2	NA	NA	NA	NA
5	NA	NA	NA	NA
Evening	NA	NA	NA	NA
Web	NA	NA	NA	NA

Table 3. Student outcomes for Math 3 sections, Fall 2007

Sections	Number of Students	Pass Rate (S grades)	Withdrawals (W grades)	Fall GPA	Credit Hrs Pass Rate
1*	22	41%	0%	1.73	52%
3*	23	43%	17%	1.89	54%
4*	21	33%	10%	2.10	57%
2	23	70%	4%	1.78	60%
5	26	42%	8%	2.73	58%
Evening	20	55%	25%	2.16	54%
Web	29	17%	17%	2.19	37%

*Sections using new teaching methods

Table 4. Relationship of Attendance in PLTL Sessions to 'S' Grade, Fall 2007

Number of Sessions	Number of Students Attending	Passed Course	Did Not Pass Course
0	5	1	4
1	1	0	1
2	2	0	2
3	1	0	1
4	1	0	1
5	2	0	2
6	2	1	1
7	3	2	1
8	5	0	5
9	4	1	3
10	3	2	1
11	3	2	1
12	4	3	1
13	4	2	2
14	5	5	0
Total	45	19 (45%)	26 (55%)

Table 5. Pass Rate by Attendance in PLTL Sessions, Fall 2007

Number of Sessions	Equal to or Less Sessions	More Sessions
0	20%	45%
1	17%	46%
2	13%	49%
3	11%	50%
4	10%	51%
5	8%	55%
6	14%	55%
7	24%	54%
8	18%	65%
9	19%	74%
10	24%	75%
11	28%	77%
12	33%	78%
13	35%	100%
14	42%	na

Interpretative Example: For students attending seven or fewer sessions, 24% passed the course, whereas 54% of students attending eight or more session passed.

Start-Up and Continuing Cost for the Intervention

Description of Expense	Unit	Total Units	Cost
Faculty training- 2006	Conferences, including travel	2 faculty members attending training and learned about PLTL; 1 attending a conference for specific training	$4,211
Peggy Beck training on MECC campus	Stipend and travel		$703
Faculty summer pay for analysis of strategies and to initiate PLTL- 2006	Credit hours + FICA	3	$5,109
Total Cost			**$10,023**

Continuing Cost

Spring 2007				
Description of Expense	**Unit Cost**	**FICA**	**Total Units**	**Cost**
Student Supervisor in GAIN	$11.10 per hour	.0765	90	$1,074
Student PLTL Leaders	$6.50 per hour	.0765	428.75	$2,532
Faculty Supervisors (2)	$1,747.71 per credit hour	.0765	2	$3,762
Adjunct faculty to work with PLTL (Woliver)	Adjunct pay credits, including FICA	.0765	3	$1,892
Full time faculty member release to work with PLTL (Yvonne Jessee)	Adjunct pay credits, including FICA	.0765	3	$1,892
Total Cost				**$11,152**

Fall 2007				
Description of Expense	**Unit Cost**	**FICA**	**Total Units**	**Cost**
Student Supervisor in GAIN (also SI)	$11.10 per hour	.0765	18	$215
Student PLTL Leaders	$6.50 per hour	.0765	233	$1,630
Faculty Supervisors (1)	$1,747.71 per credit hour	.0765	2	$1,892
Release time for full-time faculty member to redesign PLTL to be consistent with textbook	Adjunct pay credits		3	$1,892
Full-time faculty overload for coordinating PLTL	Overload credits		3	$2,713
Total Cost				**$3,737**

Spring 2008				
Description of Expense	**Unit Cost**	**FICA**	**Total Units**	**Cost**
Student Supervisor in GAIN (also SI)	$11.10 per hour	.0765		No wages recorded
Student PLTL Leaders	$6.50 per hour	.0765	113	$790
Faculty release or overload to coordinate PLTL (2)	Overload or adjunct pay credit	.0765	2	$1,566
Total Cost				**$2,356**

Fall 2008				
Description of Expense	**Unit Cost**	**FICA**	**Total Units**	**Cost**
PLTL Conference attendance for faculty member	$1,402	NA	NA	$1,402
Student Supervisor in GAIN (also SI)	$11.10 per hour	.0765	94.5	$1,129
Student PLTL Leaders	$6.75 per hour	.0765	383.5	$2,786
Faculty Supervisors (1)	$1,747.71 per credit hour faculty or adjunct pay	.0765	NA	$1,972
Training session food	NA	NA	NA	$173
Total Cost				**$7,462**

Spring 2009				
Description of Expense	**Unit Cost**	**FICA**	**Total Units**	**Cost (Budgeted)**
Student Supervisor in GAIN (also SI)	$11.10 per hour	.0765	125	$1,489
Student PLTL Leaders	$6.50 per hour	.0765	798	$5,581
Faculty Supervisors (2) for 1 credit hour each	$1,747.71 per credit hour	.0765	2	$1,878
Training session food	NA	NA	NA	$38
Budgeted Total Cost				**$8,986**

Costs for Incorporation Active Learning Strategies

Other costs of course revision

Description of Expense	Unit Cost (exact or range)	Total Units	Cost
Modumath Site License			$6,000*
Textbooks			$337
Manipulatives and other supplies			$4,773
Faculty release time	Faculty credits or adjunct faculty credits	3 credit hours each (total of 6 hours)	$8,837
Total Cost			**$19,947**

*ModuMath cost completely funded using $6,000 Achieving the Dream funds and substantial Title III funds. No further costs for the site license will be required.

What we learned while implementing this intervention

- **Extensive training for PLTL Peer Leaders in group dynamics and group leadership techniques is definitely needed.**
- **Students attending PLTL sessions become more knowledgeable and less stressed about the process of algebra problem-solving.**
- **Students attending PLTL sessions are more likely to ask/answer questions in class.**
- **We learned that students learn more by helping each other and by spending more time on task.**
- **Students seem more "connected" with each other and feel positive about the help that the "Power Hour" provides.**

Faculty, Administration and Student Conclusions Regarding Outcomes and Faculty and Administration Conclusions Sustainability

Outcomes:

Attendance at PLTL sessions seems to correlate to improved success in MTH 3. Students who participate in the PLTL sessions perform better on quizzes, tests, and the exit exam. The students have very positive comments about the time spent. They respond that they learn from working with the other students and that it helps them understand the material better. Some have requested that the PLTL sessions be extended into Algebra II.

However, because the sessions are voluntary, some students choose to not attend. At any given session, about ¼ to ½ of the students may not come to the "Power Hour."

Sustainability:

The most challenging thing has been finding good peer leaders. The peer leaders must be excellent math students, as well as have excellent "people" skills. MECC is a small college, and there is not a large pool of well-qualified applicants. If it continues with only two classes each semester, it can be sustained with the local student tutor population. However, if we wish to extend PLTL to all Algebra I classes, or even Algebra II, other sources of peer leaders must be found.

Once Lumina funding for the Peer Leaders is ended, the TRIO director has agreed to write the funding for the PLTL funding into her next grant application.