Implementing a Comprehensive PLTL Program at San Jose City College, An Hispanic Serving Institution: A Longitudinal Series of Strategies to Overcome Barriers toward Sustainability

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Abstract

Chemistry, biology, physics and math Peer-Led Team Learning.(PLTL) workshops at San Jose City College provide opportunities for students to engage in active learning through small group workshops, facilitated by a well-trained student peer leader. Academically, PLTL workshops in Science, Technology, Engineering and Math (STEM) are designed to both foster student-centered group work and create a welcoming environment beyond the classroom. Guided bya student peer leader, students in groups of 6-8 are mentored in study skills and problem solving strategies. Such tools are honed in the workshop and re-designed to also equip students to become active, responsible and successful learners. Outside the classroom in a workshop, students establish a learning community, connecting with their peers and acculturating to academic life. These activities influence retention and success, especially among ethnic minority students. Comparing and contrasting results of student who participate versus those who do not participate in weekly PLTL workshops, and an analysis of the data, reveal that the San Jose City College (SJCC) Peer-Led Team Learning (PLTL) program significantly contributes to increasing course completion and success rates among students of all ethnicities within this Hispanic Serving Institution (HSI). SJCC's Peer-Led Team Learning (PLTL) program is unique in the way it implements peer leader training elements, borrowing many attributes from both "On Course" learner-centered structures and strategies, as well as a variety of small group, peer-assisted learning strategies including Supplemental Instruction (SI). On Course strategiesprovide empowerment techniques that contain methods for acquiring a variety of life-long skills to help students succeed professionally as well as in their personal lives. These strategies are implemented in peer leader orientation and weekly trainings with the stipulation that peer leaders will transfer those skills to students in their workshops. The advantages of acquiring and implementing "On Course" student success strategies not only benefit workshop participants and peer leaders, but also do so while expanding the repertoire of teaching techniques in the classroom, thus adding another dimension to the professional growth and development of faculty.

Overview

Our case study begins with an overview of this academic institution, a demographically diverse community college in the heart of Silicon Valley, and proceeds with a detailed description of the components and evolutionary process by which its comprehensive PLTL program achieved (is achieving) sustainable financial status. Much of the success toward sustainability commenced recently in fall 2010, through the effective collaboration with the SJCC Metas Center[1] (i.e., supported by a U.S. Department of Education, Title

V: Hispanic Serving Institutions grant). The many common goals or "Metas," as it is translated from the Spanish language, that are shared with the PLTL program, fostered a natural collaboration, perfectly aligned with the institution's mission, and that is, "*effecting social justice by ensuring open and equitable access to quality education and programs that both challenge and prepare individuals for successful careers and active participation in a diverse, global society.*" Mutual goals, program components, and measureable outcomes were specifically identified and timelines pre-determined, in order to accomplish the goals set forth by leaders of the Metas Center and PLTL program. Collaboratively, program leaders under the leadership of the Metas director constructed a framework to track and/or measure the efficacy of program components and goals including: (a) understanding whether SLOs were being met, (b) quantifying rates of student success, retention, and persistence, and (c) analyzing effectiveness of program components. These are continuously monitored for annual program reviews, continuous program improvement, allocation of funds and refinement via employing electronic surveys, focus groups, individual interviews, and observations with input from all stakeholders (administrators, faculty, students, evaluator, and staff). The initial focus of the collaboration was borne out of the determination to meet two well-defined challenges especially for SJCC students who are from underrepresented groups, are first in their generation to attend college, and have financial need. The two challenges given the highest priority to address by the Metas Center and the PLTL program are to (a) devise effective strategies that simultaneously improve student learning outcomes among STEM graduates and (b) address the disparity in academic achievement for racial and ethnic minority groups. Both phenomena are observed not only at SJCC, but occur nationwide. It is noteworthy, that despite a rapidly growing Hispanic population, this ethnic group in particular, earns only 8.2% of STEM degrees (NSF, 2009). With over 2 million additional STEM-field jobs projected between 2008 and 2018, the demand for college graduates qualified to fill STEM related jobs will be critical to the nation's economy and thus, the ability to address the disparity becomes that much more urgent. Herein, we share the SJCC-PLTL programmatic results that specifically address both challenges. As well, we include detailed processes and strategiesthat are leading thishigh-intensive PLTL program toward complete sustainability.

Introduction

   The aim of this paper is to provide a case for adopting and adapting a high-quality, peer-assisted learning program, namely Peer-Led Team Learning (PLTL), as well as to describe ways to allocate institutional resources in order to achieve sustainability. The central component of the program is the weekly PLTL workshop, where a small group of students, led by a well-trained peer (i.e., who is skilled in pedagogy, group dynamics, and content), collaborate at all levels. In a PLTL workshop, students develop and hone skills in problem solving, team work, oral communication, and other student success strategieswhile working collaboratively on carefully structured, content-specific workshop exercises, under the facilitation of a Peer Leader. Thus, the workshop participants bond very quickly to each other and with the peer leader, forming a community of learners who gain confidence and competency in the subject matter.

   SJCC, one of 112 California Community Colleges, accommodates ~12,000 commuter students annually, of diverse ages, backgrounds, ethnicity, with ~35% and ~55% eligible for federal and state financial assistance, respectively. Students have a choice of paths leading toward two-year college degrees and certificates, lower-division transfer and general education courses, basic skills and English as a Second Language instruction, and/or careers in technology training.

   Historically, the implementation of PLTL workshops at San Jose City College began during the summer of 1999 in an introductory chemistry course, with funding from a collaborative National Science Foundation grant. Over the period from 1999-2006, funding for the SJCC-PLTL program continued with NSF grants with augmentation from supplemental state and local grants, including California Partnership for

Excellence, and University of California at Santa Cruz's (UCSC) Educational Partnership Center grants, with a combined total of ~.5 million dollars. Financial support for PLTL workshops, from 2007-2010 was sporadic and was derived mainly through a combination of faculty donations and generous pro bono work and service learning given by faculty and student peer leaders. More recently, beginning in 2011 and currently, the PLTL program is supported through a Title V: Hispanic-Serving Institutions grant in collaboration with the SJCC Metas Center.

Since its initiation in an introductory chemistry course, the PLTL program has experienced successive expansions as well as contractions in other chemistry and STEM courses. Currently, PLTL workshops are implemented in all introductory and first-year chemistry courses and at least one STEM course in biology, physics and math at SJCC. Addressing the waxing and waning of workshops in STEM courses, providing evidence of program effectiveness, with respect to student achievement, narrowing achievement gaps, and finally, describing the components necessary to achievestability and expansion are the four main goals of this project.

Demonstrating program excellence and cultivating a culture of change

Although the first handful of chemistry PLTL workshops was first implemented more than a decade ago, the program has not yet received nor been fully sustained with institutional funds. Despite uncertain financial support and as evidence that ours is a high-quality program, the SJCC-PLTL program was and continues to enjoy recognition by local, state, as well as national organizations including SJCC Associated Students (2012), the Santa Clara Valley Section of the American Chemical Society (2011), Dr. Gordon Bates and Chris Toth, in recognition of "Creating Outstanding Learning Environments" sponsored by David Viar, Executive Director of the 18th International Biennial Conference for Educators at the University of British Columbia (2005), the "Community College League of California Award: Celebrating the Way California," San Jose Fairmont Hotel (11/16/2002); "Certificate of Award in Honor Of Innovation" by Chui Tsang, President SJCC (2002); "The Teaching Learning Center and Office of the Chancellor," San Jose/Evergreen Community College District (2001); and the "1st Annual Teach for Tomorrow Conference, Connect to your Future: Celebrate Teaching!" by The South Bay-Monterey Bay Regional Consortium at SCU-Monterey Bay (4/28/2001).

SJCC is no different from other established academic institutions when it comes to experimenting with the implementation of innovations in education and developing best practices in teaching and learning, that is, until an enthusiastic group of dedicated students together with a core of committed faculty, staff, and administratorsbegan working as a team to become the influential change agents necessary to overcome resistance to change. The collaboration with SJCC-Metas Program created a strong social network with participation with the director of the grant, faculty club advisors and primarily peer leaders, many of the latter who serve(d) as members of SACNAS and ACS clubs. Such a social network of highly dedicated and committed change agents, operating as tools of political influence, effectively co-opted fence-sitters (organization members who were ambivalent or resistant to change that diverged from the status quo of institutional practices) to adopt the change, namely integrating PLTL workshops in STEM courses. This cooptation method in convincing fence-sitters has been demonstrated to be effective as evidenced by longitudinal data from over 50 case studies of organization change initiatives conducted at the National Health Service in the UK and reported by the Julie Battilana and TizianaCasciaro report in "Overcoming Resistance to Organizational Change: Strong Ties and Affective Cooptation," in *Management Science I,* October 2012 (mnsc.1120.1583).

As alluded to, and prior to collaboration with Metas, the PLTL program lacked the support, expertise, and programmatic framework necessary to put in place the tracking tools and mechanisms to be

accurately monitored. The Metas collaboration also brought visibility to the program, demanding attention from STEM faculty and students as well as college leaders. Indeed, the director of Metas was instrumental in inserting the program into the college's strategic plan and procuring convincing programmatic evidence to "show cause." This evidence-based approach was communicated and clarified for college leaders to "show" that the PLTL program is worthy of the allocation of resources required to be fully sustained (e.g., maintain a high level of rigor and thus continue to distinguish it as a high-quality PLTL program).   Since the fall of 2010, when the collaboration between the Metas Center and PLTL program was in the planning phase, new protocols were established to improve accountability and quality in peer leader training; scheduling workshops; and collecting program attendance in order to respectively enhance the performance and effectiveness of peer leader facilitators, accommodate the needs of students, and capture trends in PLTL workshop student enrollment. Since then, hard-copy and electronic (SARS) attendance tools for workshops have been refined to include demographic and student completion data[2].   For further information on "How are Student Learning Outcome (SLO) assessment and campus-based research data utilized to improve instruction?" see appendix.

Evidence-based theories, results and data to substantiate that appropriate institutional resources are allocated

Using Keimig's hierarchy, D. Arendale[3] contrasted and compared several Peer Assisted Learning programs, and concluded that PLTL be classified at the highest level of improved student outcomes, or level four: Comprehensive learning system. It is well known that level 4 programs demand the most institutional resources and changes in the campus environment. The increased retention and success welcomed by students and faculty and measured for those courses where PLTL workshops are offered is consistent with results from level 4 programs. In an effort to procure and sustain financial support from the institution and in order to ensure the perpetuity of the program, faculty, peer leaders, consultant/evaluator, and the Metas Director prepared a comprehensive program review. The PLTL program review included a financial report and data supporting the effectiveness of the program. Results from the program review were disseminated in the form of brochures, articles in the campus newspaper (City College Times, http://sjcctimes.com/) and scheduled presentations to convince and inform campus students, faculty and campus leaders, including trustee members the San Jose Evergreen Community College District.   Within the program review, a cost/revenue analysis revealed that the program is fiscally useful, generating enough down-stream revenue in the form of FTEs to more than cover the financial costs necessary to run both weekly PLTL workshops and leader trainings, the largest expense. See Table 6 in the Addendum for an itemized cost/revenue spreadsheet. Not included in this cost/revenue analysis were additional FTEs as a result of student retention.   Student persistence and student success in the course are other important benefits that are difficult to estimate financially.

A summary analysis of enrollment, retention and success data within the PLTL program review follows. An evaluation of the data, beginning in fall 2011 for an introductory level chemistry (Chem 15) and both semesters of our introduction to general, organic and biological chemistry courses (Chem 32A and Chem 32B), reveal that student success and retention for those students who regularly participate in weekly PLTL workshops were significantly higher when compared to both earlier SJCC data as well as that reported for PLTL's national average, 93.65% and 82.54%, respectively as compared to students who do not participate in PLTL workshops, with 64.83% or 52.94%, respectively.   Our data also reveal that the PLTL program is closing the achievement gap for underrepresented ethnic groups of students in chemistry. For example, preliminary retention and success data for our Hispanic population in the courses specified above, show respectively, 87.5% and 68.75% (versus 74.63% and 61.70% for non-PLTL). Corresponding data for our Asian population are 100% in both measures for PLTL students while for non-PLTL students the

corresponding data are 84.82% and 76.96% for retention and success. Clearly, the benefits of PLTL are acquired among all demographics. Aggregate data from the spring 2012 semester reveal similar overall trends, with 89.4% of the 132 participants earning a grade of C or better while 343 non-participants succeeding at a 74% rate while simultaneously decreasing withdrawal rates from 22% to 6%. Corresponding disaggregated data among campus ethnic groups showed that Hispanics, comprising 36% of the participants, passed at a 7.8% higher rate in comparison to Hispanic students who did not participate.

PLTL Program Components: How do the program student learning outcomes align with and support San Jose City College's mission and institutional student learning outcomes?

Consistent with the college's mission and goals, the PLTL program provides equitable access to all students enrolled in all sections of the targeted courses. The Six Critical Components characterizing the PLTL model and Program Student Learning Outcomes (PSLOs) of the PLTL program are implemented in a way that enhances and expands student learning and retains students who are reaching for any four of the academic goals stated in the San Jose City College Mission.Upholding the mission of the college, the PLTL and Metas programs both contribute to helping "*fulfill our commitment to student learning and to assist students of all ages and backgrounds in achieving their education, employment, and life-long learning goals.*" The distinct features of **PLTL's Six Critical Components**[4] and SJCC-PLTL program SLOs[5] best serve our students to develop skills to be successful in STEM courses and beyond. For a detailed mapping of all SJCC Peer Led Team Learning PSLOs as they are related to the Institutional SLOs, see map in the Appendix.   What follows are detailed descriptions of the implementation for each of the six critical components.

1. The Workshop is integral to the course. SJCC-PLTL faculty practitioners include a description of the program in their syllabi and invite peer leaders to their classes during the first week of the semester. During the peer leader's 10-minute classroom visit, a presentation is given to the class that both promotes the program and encourages students to participate. Peer leaders assist the instructor with scheduling the weekly workshops (with a minimum of three students). The workshops are scheduled at convenient times to accommodate students enrolled in morning, afternoon, and evening STEM courses. Peer leaders also inform the students in the class that workshop participation can help them: (a) earn up to 5% extra credit, (b) become part of community, and(c) learn study skills that make learning more efficient. Using their weekly participation score, peer leaders calculate each participant's extra credit (based on a rubric, published in the peer leader manual as well as the course syllabus) and submit it to the corresponding instructor before the last week of the semester.

2. Course professors are involved in the selection of materials, training and supervision of peer leaders, and they review the progress of workshops.
Workshops, together with the instructor create a community of learners. Peer leaders are generally assigned to work with an instructor and are expected to schedule weekly one-hour meetings, encouraged to meet during a scheduled 2-hour session during the 2-day orientation to review syllabi, identify the materials and exercises that will be included in the first two weeks of workshops; and collaboratively complete separate planning sheets for the first two weekly workshops of the semester. From there on out, they meet weekly, usually in the instructor's office to review workshop materials and ensure that the workshop exercises are aligned with the lecture topics. Peer leaders and faculty at SJCC have discovered that the learning-centered tools acquired during weekly peer leader training meetings and implemented in these peer-assisted learning workshops are empowering students both professionally and personally. The relationship between the peer

leader and instructor further strengthens, becoming less of an instructor-student relationship and resembling more and more one of collegiality

3. Peer leaders are selected, trained and supervised to be skilled in group work as facilitators.
The success and retention of the students in PLTL workshops hinges largely on the quality and passion of the peer leader which in turn, is dependent in part on the continuous and comprehensive training that they receive. Peer leaders are recruited and hired on the recommendations of both the instructor and peer leader(s). All peer leaders, veteran and novice, are required to attend a mandatory 2-day PLTL training-orientation. Along with the responsibilities that come with being a peer leader, including preparing for and facilitating a minimum of two 90-minute weekly workshops, many peer leaders go above and beyond what is expected. In fact, and most peer leaders also participate in optional activities including becoming members of ACS and SACNAS campus clubs and professional organizations, co-presenting with faculty at conferences, co-authoring manuscripts for publication and more[6]. But that is not surprising, as most students who become peer leaders are overachievers, highly motivated, goal- and career-oriented, have excellent study skills, are organized, etc. Thus, they also serve as superb role models who, in turn, inspire students to become future excellent peer leaders.

Much of the training utilizes case studies and student success strategies, largely derived from *On Course: Strategies for Creating Success in College and Life*, 7th Ed[7] , developed by S. Downing and *Learning in Groups*, 3rd Ed, by D. Jaques[8]. Some of the attributes of Supplemental Instruction have also been incorporated into the peer leader training. The intensive 12 hour, 2-day orientation and weekly leader trainings include sharing insights and encouraging a buddy system between veteran and novice peer leaders, developing camaraderie among leaders, designing a PLTL Workshop exercise on a STEM concept, role-playing in mock workshops, tips for surviving the first workshop, breaking the ice and establishing a set of 8 ground rules, reviewing examples and instructions on creating an agenda for each series of 90-minuted weekly workshop and completing weekly planning sheets (specifying pedagogy, study skills, examples, concepts, problem-solving strategies, etc), learning protocols for administrative duties including grading using rubrics and electronic management systems (eg. to enter the 0%-5% participation and attendance data which is provided to the corresponding STEM instructor the week before finals), reading pertinent assignments and becoming knowledgeable in district employee responsibilities and code of conduct, student code of ethics, develop competencies in pedagogy, leadership, respecting cultural differences, regulations and resources for disabled students and other campus resources, develop a personal teaching philosophy statement and more. Each peer leader is also provided with a program manual, binder/portfolio and a pouch containing lanyard, whiteboard markers, erasers, etc. Such training that is continuous strengthens relationships and builds a strong foundation for teaching and learning.

In addition to the mandatory 2-day orientation, continuous paid leader training occurs throughout the semester and scheduled during: (a) weekly, hour-long weekly training meetings traditionally scheduled on Friday mornings and facilitated by the program coordinator and (b) 1-hour weekly meeting with the course instructor. In addition, each leader schedule 2 hours of prep-time (1 hour of which is conducted on campus to facilitate collaboration) to complete weekly planning sheets and a minimum of one 90-minute peer-to-peer observation (to be completed by the end of the second month of the semester - where each leader is required to schedule a minimum of one observation with a peer and be observed by a peer. An observation form is completed and a follow-up meeting scheduled, between the evaluator-evaluatee to exchange information. During the 90-minute observation, peer leaders evaluate each other based on: effective use of time, organization, and preparedness; content covered; facilitation, study skills and pedagogy implemented; time students spend actively engaged; goals of the workshop; effective communication, and closing organization.

Soon after the observation, a follow-up meeting between the evaluatee and evaluator is scheduled to: provide constructive feedback, discuss the strengths and weaknesses, and collaboratively develop a plan for further improvement. At the discretion of the evaluator-evaluatee, the content of the observation and insights gained during the evaluation process may be shared at the weekly leader meetings. The largest investment in the PLTL program is compensating peer leaders for their time mainly to prepare for and lead workshops as well as participate in a continuous, and comprehensive training program that includes, a mandatory 2-day orientation prior to each semester and hour-long weekly training meetings. Peer leaders are compensated for their work at the minimum wage rate.

4. *Workshop materials are appropriately challenging, directly related to tests, designed for small group work.*PLTL faculty practitioners adopt and/or adapt workshop materials that encourage collaborative work and exercises are progressive increases in their level of difficulty. Facultyprovide workshop exercises via hard or electronic copy to the students in the class. During the instructor-peer leaders weekly, one-hour meetings the instructorprovides guidance, identifies areas of confusion, and reviews the material and ensure that the activities covered in the workshop exercise are aligned with the lecture content. In some cases, they all conduct a mini-mock workshop.

5. *The Workshops are held once a week for 90 minute - sessions, contain six to eight students per group, in a space suitable for small-group activities.*
The central component of the multifaceted program is a weekly 90-minute workshop for students enrolled in STEM courses. A culture of active, responsible learners is created where students acquire invaluable team building experiences and student success strategies. Each person is encouraged to express creativity, demonstrate problem solving skills, and develop an openness to learn from their own mistakes in a respectful and nurturing environment.

6. *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*. It is this critical component that is not yet fully realized, yet is a central theme to this communication, described herein.

III. b. A study of SJCC enrollment trends and student population (eg. demographics-age, gender, ethnicity, income, previous education): What is the SJCC-PLTL program's impact on student learning and professional growth and development?
PLTL workshops at SJCC are open to all students enrolled in designated STEM courses. In an enrollment report of students who participated in PLTL between the fall of 2011 and spring of 2012, a breakdown of demographics by ethnic group shows that PLTL student participants reflect the overall population of San Jose City College. Table 1 compares the enrollment of PLTL participants to the total headcount of SJCC students by ethnic group. Future research studies are pending which will include additional demographic data such as age, gender, first year students, returning students, and other elements in an effort to learn more about how best to serve our population.

Table 1. Enrollment of PLTL Participants to SJCC Enrollment by Demographic Data

| Ethnicity | PLTL | | PLTL | | PLTL | | SJCC | |
| | N | % | N | % | N | % | N | % |
	Fall 2011		Spring 2012		Fall 2011 + Spring 2012		Spring 2012	
African American	7	11%	11	8%	18	9%	807	7.96%
Asian	15	24%	31	23%	46	24%	2,200	21.70%
Filipino	6	10%	13	10%	19	10%	329	3.24%
Latino	16	25%	47	36%	63	32%	3,894	38.41%
Native American	0	0%	0	0%	0	0%	57	0.56%
Other Non-White	2	3%	3	2%	5	3%	274	2.70%
Pacific Islander	1	2%	0	0%	1	1%	89	0.88%
White	9	14%	17	13%	26	13%	1,742	17.18%
Not Specified	7	11%	10	8%	17	9%	747	7.37%
Total	**63**	**100%**	**132**	**100%**	**195**	**100%**	**10,139**	**100%**

During spring 2012, a total of 132 unduplicated students participated in weekly PLTL workshops. Among the eleven peer leaders hired for spring 2012 term, a total of 34 workshops (60 minutes in duration, per workshop) were scheduled between Monday-Friday for a period of 14 weeks (barring the first and last weeks of the semester). The weekly attendance for workshops averaged 134 visits per week while the total number of workshop visits was 2115 for the spring 2012 term.

Since our conference presentation in May 2012, additional survey results from fall 2012 provided evidence that the PLTL program was viewed positively by PLTL participants. Students enrolled in chemistry courses at San Jose City College in which the Peer-Led Team Learning (PLTL) program was being implemented, were surveyed. Both students who volunteered to participate in the PLTL program and those who did not were invited to complete the survey. The purpose of the survey was to provide information that could be used to help evaluate the effectiveness of the PLTL program and lead to further improvement. More than nine out of ten survey respondents specified that they would definitely recommend the PLTL program to a friend. Respondents also believed that the greatest strength of the program was the excellent work done by the peers leading the PLTL workshops. Additionally, PLTL participants indicated that other students attending the workshops contributed to their learning. Among survey respondents who did not participate in the PLTL program, the majority specified that the reason they did not participate was because the workshop time slots did not fit their schedule.

While PLTL participants and non-participants rated most survey items similarly, there were some differences. Specifically, PLTL participants rated the following items significantly higher than did non-participants: knowledge of how to get assistance when needed; the degree to which SJCC students as a whole are helpful and respectful; amount of interaction and the degree to which they shared notes and learning strategies with their chemistry classmates; and the amount of time they spent discussing course material with their instructor. Conversely, PLTL non-participants more often learned course material on their own than did program participants. This latter finding provides some evidence that students participating in the PLTL program may learn better collaboratively, while those who do not participate may learn better by themselves. Survey results also showed that all respondents rated their chemistry classmates as being more supportive, helpful, friendly, and respectful than SJCC students as a whole. PLTL participants rated the following as being the most valuable about their workshop experience: providing them with a better understanding of course concepts and material; preparing them better for exams; having the opportunity to work with

classmates; and the repetition and practice of course material. Since Fall 2012, we have addressed most of the student's recommendations to offer workshops during additional time slots including Fridays (with the exception of weekends), incourses beyond chemistry and specifically, biology, math, and physics, maintain workshop length at 90minutes, and continue to hire PLTL workshop peer leaders exhibiting the traits possessed by the fall 2012 leaders. Upon request more detailed findings will be provided in a report, entitled "Fall 2012 Peer-Led Team Learning (PLTL) Student Survey Results."

IV. Understanding PLTL program data and projecting cost/revenue and: Student retention and success and narrowing the achievement gap to justify sustainability and use metric-driven decisions to allocate resources effectively

Results for retention and success are disaggregated by course and ethnic groups from fall 2011 to spring 2012. Comparative resultsfrom Table 2 show differences between PLTL workshop participants and non-PLTL students enrolled in chemistry courses. The data demonstrate that student who participate in PLTL workshops have significantly higher rates of retention and success. Persistence data is pending on data released from the SJCC Office of Institutional Support and Effectiveness and research conducted by Dr. Christopher Myers.

Table 2. Comparison of PLTL participants vs. non-participants in Chemistry Courses – 2011-2012

ENROLLMENT REPORT	Fall 2011						Spring 2012					
	PLTL		Non-PLTL		Total		PLTL		Non-PLTL		Total	
Course	N	%	N	%	N	%	N	%	N	%	N	%
Chem 1A-Gen Chem							17	12%	127	88%	144	100%
Chem 15-Fundamentals	1	1%	121	99%	122	100%	2	1%	161	99%	163	100%
Chem 32A-Intro Gen Chem	30	25%	89	75%	119	100%	73	60%	49	40%	122	100%
Chem 32B-Intro Gen Chem	32	76%	10	24%	42	100%	40	87%	6	13%	46	100%
Total	63	22%	220	78%	283	100%	132	28%	343	72%	475	100%

Fall 2011 results in Table 3 show that 59 of the 63 PLTL participants were retained at a 16 percent higher rate of retention when compared to student who did not participate in PLTL. In the Spring of 2012, PLTL gained a 21 percent greater rate of retention than non-participants. Corresponding results for African American and Latino ethnicities reveal increases in retention of 32% and 13% for Fall 2011 and 19% and 15% for Spring 2012, respectively.

Table 3. Retention among PLTL participants vs. non-participations in Chemistry Courses – 2011-2012

RETENTION REPORT	Fall 2011						Spring 2012					
	PLTL		Non-PLTL		Total		PLTL		Non-PLTL		Total	
Course	N	%	N	%	N	%	N	%	N	%	N	%
Chem 1A-Gen Chem							15	88%	96	76%	111	77%
Chem 15-Fundamentals	1	100%	101	83%	102	84%	2	100%	126	78%	128	79%
Chem 32A-Intro Gen Chem	26	87%	65	73%	91	76%	69	95%	31	63%	100	82%
Chem 32B-Intro Gen Chem	32	100%	5	50%	37	88%	39	98%	2	33%	41	89%
Total	**59**	94%	171	78%	**230**	81%	**125**	95%	255	74%	**380**	80%
Ethnicity												
African American	7	100%			32	68%	11	100%			35	81%
Asian	15	100%			162	85%	30	97%			170	89%
Filipino	6	100%			27	84%	13	100%			35	88%
Latino	14	88%			100	75%	42	89%			128	74%
Native American	0				2	67%	0				2	50%
Other Non-White	2	100%			6	75%	3	100%			6	67%
Pacific Islander	1	100%			4	50%	0				1	33%
White	8	89%			44	73%	17	100%			72	83%
Not Specified	6	86%			34	79%	9	90%			37	79%
Total	**59**	94%			**411**	78%	**125**	95%			**486**	81%

A comparison of success rates,during Fall 2011 and Spring 2012, between students who participated and who did not participate in PLTL workshops where success rates are defined as receiving a passing grade of A, B, or Care shown in Table 4. As revealed in Table 4, success rates are also significantly higher among PLTL participants with 83 percent of PLTL participants passing compared to 61% who did not participate (22% higher) chemistry in the fall of 2011 and 81%compared to 66% (15% higher) in spring of 2012.

Table 4. Grade Comparison of PLTL participants vs. non-participants – 2011-2012

SUCCESS REPORT	Fall 2011						Spring 2012					
	PLTL		Non-PLTL		Total		PLTL		Non-PLTL		Total	
Course	N	%	N	%	N	%	N	%	N	%	N	%
Chem 1A-Gen Chem							14	82%	86	68%	100	69%
Chem 15-Fundamentals	1	100%	87	72%	88	72%	2	100%	117	73%	119	73%
Chem 32A-Intro Gen Chem	21	70%	42	47%	63	53%	55	75%	24	49%	79	65%
Chem 32B-Intro Gen Chem	30	94%	5	50%	35	83%	36	90%	1	17%	37	80%
Total	**52**	83%	134	61%	**186**	66%	**107**	81%	228	66%	**335**	71%
Ethnicity												
African American	7	100%			25	53%	9	82%			32	74%
Asian	15	100%			147	77%	28	90%			161	84%
Filipino	5	83%			21	66%	12	92%			34	85%
Latino	11	69%			70	52%	32	68%			108	62%
Native American	0				2	67%	0				2	50%
Other Non-White	2	100%			6	75%	2	67%			5	56%
Pacific Islander	1	100%			3	38%	0				1	33%
White	7	78%			38	63%	15	88%			63	72%
Not Specified	4	57%			29	67%	9	90%			33	70%
Total	**52**	83%			**341**	65%	**107**	81%			**439**	73%

It is also important to note that the achievement gap for students of all ethnicities who participated in PLTL workshops narrowed when comparing PLTL with non-PLTL results. For Latinos, retention in STEM courses increased by 17% and 6% and for the African American retention increased by 47% and 8% for Fall 2011-Spring 2012, respectively (over the total population, not disaggregated). Corresponding success data over the same periodfor African American and Latino increased by 47%, 8% and 17% and 6%.

V. Scaling up PLTL while maintaining program quality: Lessons using metric-driven decisions derived from cost/revenue estimates to(a) expandand increase the number of PLTL workshopsin STEM courses and (b) effectively allocate resources to sustain a high-quality program

In spring of 2011, five peer leaders were hired under the Metas Program to directly target Chem 15 and Chem 32A learning community courses linked to dedicated Math 13 courses. Concentrated in chemistry courses, PLTL expanded from the fall of 2011 to the fall of 2012 with an average of 12 peer leaders hired per semester, excluding summer. PLTL scaled up in the spring of 2013 with a significant increase in the hiring of 43 peer leaders. Responding to student surveys conducted in the spring and fall of 2012, PLTL workshops are being offered in other STEM courses this spring 2013, namely General Physics (Phys 2A), Pre-calculus, Algebra, and Trigonometry (Math 25), and General Biology (Bio 21).

An immediate goal is that all the components, including the sixth described above, that make the Peer-Led Team Learning model of small group peer assisted learning successful, will be sustained with appropriate resources allocated by the institution. Towards that end, a resolution unanimously passed the San Jose City College Academic Senate, on Tuesday, May 15 2012, stating that the following goals will be fulfilled: "Therefore be it resolved that, the Academic Senate support this resolution and move that the Peer-led Team Learning Program be sustained with institutional support at San Jose City College." The complete resolution is available upon request.

Additionally, it is the goal of PLTL program leaders to implement cost effective measures such as collecting apportionment by upholding Title V standards and criteria for noncredit courses. Once PLTL is tied to the official course outline of record (e.g., under LS-210 Supervised Tutoring), increased student retention, success, and persistence rates attributed to PLTL will generate FTES (full-time equivalents) for additional apportionment revenue. Within the scope of the research conducted by Dr. Christopher Myers, the external consultant, PLTL is undergoing an evaluation along with a cost-effective analysis. Implementing metric-driven decisions and estimating the revenue that is generated from workshop attendance and possibly generated as a result of increased retention and persistence rates, a preliminary cost/revenue analysis can be found in the Addendum (sent to VPAA). It is anticipated that appropriate institutional resources allocated to maintain the PLTL program's effective learning model (i.e., for as a diverse student body as SJCC's), will help further strengthen and foment the sustainability of small group peer assisted learning. Collecting apportionment will help offset the cost the program and in fact, from our preliminary estimate, generate revenue over the cost of training and compensating workshop leaders.

Another avenue the program leaders are considering is the development of a curriculum-based leadership course which will offset or eliminate the cost of (paid) peer leader training. More importantly, it could further formalize the training component and will further enhance the development of skilled leaders. Peer leaders receive approximately 27 hours of paid training per semester. Under careful evaluation, the program is considering developing curriculum for a leadership credit-based course to provide training for peer leaders, where peer leaders would be required to enroll in the leadership course.

VI. Conclusions

The PLTL program being implemented at San Jose City College takes a small group peer assisted learning approach to increase learning, retention, success and persistence, especially of underrepresented students in STEM. Simultaneously, PLTL workshops have transformed an academic culture in which students come first, a culture of open access, accountability, excellence, rigor and multifaceted. The scope of the challenges and solutions to empower students to become responsible active learners resulted in the development of a program that included attention to high quality academics, high expectations, top decile of student performance and within which contains (a) proven pedagogies and best practices in education and (b) one that could be scaled up to meet a broader range of STEM courses.

This call to action is as heroic as it is challenging. It is lengthy and intensive, requiring patience and persistence. But our own commitment and passion to serve others matches that challenge. This endeavor brings huge satisfaction to students, peer leaders, faculty and program leaders in helping others reach their potential. But more than that, PLTL is designed to form partnerships with joint decision-making processes that involve consulting from within and outside the campus community. To the extent possible, each of the program's components is implemented and effectiveness measured. Our data, along with anecdotal evidence demonstrate that it has a far-reaching impact, altering the course of hundreds or thousands of lives with more future successes to come, both within and beyond the confines of the classroom. The most vigorous advocates, peer leaders and program leaders, set the cultural tone and get everyone believing in that guiding mission statement. They get people excited about the results and convince them that success will continue. Those who are immersed with the program further extend their network, deepen relationships while enriching themselves professionally and personally fulfilling their own lives. Success for the program has required and continues to require constant refinement and articulation of goals, assessing and evaluating measureable outcomes, implementing appropriate technologies to achieve those goals, adopting and adapting the delivery systems along the way, constant and intensive monitoring how people are doing en route to achieving those goals, and holding people accountable during the entire process. The program leaders devote

a sizable part of their lives including pro bono human intellectual capital, leadership, resources guidance, management, and technology expertise. As well, they set both short- and long-range planning goals and establish metric-driven decisions to assess the best use of time, financial resources, and energy and are the ones who get to write the letters of recommendation, share students' joys and read the letters of thanks. It is a communal relationship of collegiality, friendship and love. This is our lifetime work and ultimately our legacy that we will work on for as long as it takes to expand and sustain the small-group peer-assisted model, providing these opportunities to as many students as possible.

ADDENDUM
Following the time of the Inaugural PLTL-IS conference the following program developments came to fruition and are highlighted below.

As of the time of this submission, the first annual self-study of the PLTL program was submitted in the form of a comprehensive program review, and so far has set a high institutional standard and been enthusiastically embraced by the college community. It included a comprehensive examination of trends, beginning from Fall 2011, from the past to present as well as projections into the future. The PLTL program has undergone cost-revenue estimates for Spring 2013 (see Tables 6 & 7, below), where FTEs, projected for attendance at 1330 workshops/semester attended by numbers of students weekly and led by 43 peer leaders generate over $50,000 in revenue, offsetting $42,000 in peer leader costs, thus netting more than $6,000/semester. Considering an average of four students per 90-minute workshop, the hourly cost per student is $5.30. Thus far, an analysis of the research results has validated that the program is addressing retention and success in STEM courses and narrowing achievement gaps in SJCC's underrepresented student population. While simultaneously generating revenue beyond the financial costs of the duties of the peer leaders, metric-driven decisions for program review, refinement, improvement, effective use of existing facilities, technologies and other resources have also stimulated both self-reflection and dialogue among faculty, students, administrators, and staff. Program review conclusions and recommendations are used in department, division, College, and strategic planning processes and lead to further improvement, alignment with established objectives, and planning for the future. Along with the unanimous passage of the resolution by the Academic Senate to provide appropriate resources to sustain the PLTL program, PLTL was inserted into the college strategic plan, thus both establishing a financial allocation and an awareness of the program's attributes and benefits by all the institution's stakeholders.

We recently hired and trained 43 peer leaders who lead approximately 70 workshops per week. See Table 5, below.

Table 5. Correlating Increase in Retention to Costs of Peer Leaders

	Spring 2011	Fall 2011	Spring 2012	Fall 2012	Spring 2013
Total Peer Leaders	8	5	11	15	43
Total Cost Per Term	$4,727	$7,224	$15,234	$18,727	Projected $43,170
*Total Hours Per Term	490	740	1560	1920	4317

*The hours per term include compensation for workshop hours, training hours, and preparation.   It is important to note that PLTL offered 60-minute workshops through the spring of 2012 and increased to 90 minutes beginning in the fall of 2012.

Table 6. Projected Program Expenses – Spring 2013

Spring 2013			Projected Cost
Peer Leaders	43		
2-day Orientation & Training	12 hrs	43 x 12	$5,160.00
1-hour Weekly Leader Meetings	12 hrs	43 x 12	$5,160.00
2-hour Weekly Prep-Time	2 hrs	43 x 2	$12,040.00
2-hour Peer Leader Observations and follow-up meeting	2 hrs	43 X 2	$860.00
1.5-hour Workshops per week (eg. Spring 2013 schedule)	95	(95) (1.5 hrs) ($10) (14 weeks)	$19,950.00
Hourly wage	$10.00		
Total Weeks of workshops and meetings	14		
TOTAL			$43,170.00

Table 7. Projected FTES for PLTL Workshop Attendance Spring 2013*

FTES	Budget – Workshop Attendance
1330	95 workshops per week x 14 weeks
5320	1330 x an average of 4 students per workshops
478800	5320 x 90 minutes
9576	478800 / 50 minutes
9576	50-minute instructional hours
18.24	9576/525 (An FTES represents 525 class (contact) hours of student instruction/activity in credit and noncredit courses)
$50,068.00	18.24 FTES x $2745 (noncredit revenue per FTES by state)

*Does not include the extra increase in ~18% retention attributed to those students who attended PLTL workshops when compared with those who did not (e.g., non-PLTL).

1. Course mapping illustrating how course Student Learning Outcomes align with Program Student Learning Outcomes

Table I.6

Programs:	Peer-Led Team Learning						
program:	Metas (U.S. Department of Education – Title V: Hispanic-Serving Institutions Grant	ISLOs					
		A	B	C	D	E	F
Enter Level of PSLO Addressed in program:	0 = Not addressed in this program 1 = Introduced in this program 2 = Developed in this program 3 = Mastered in this program	1. **Communication:** Students will communicate effectively including reading, writing, speaking and listening.	2. **Critical and Analytical Thinking:** Students will analyze problems using evidence and sound reasoning to make decisions.	3. **Global Awareness and Social Justice:** Students will demonstrate an awareness of social, economic, ecological, historical, and cultural differences and their implications.	4. **Personal Responsibility, Ethics and Civility:** Students will demonstrate personal and civic responsibility and professional integrity.	5. **Technology:** Students will utilize technology effectively for informational, academic, personal, and professional needs.	6. **Aesthetics and Creativity:** Students will develop an appreciation of the arts and engage in the creative process.
PSLO ID	**PLTL Program SLOs**	A	B	C	D	E	F
1	Students will actively engage in a small group setting by participating in student peer-leader facilitated workshops to acquire and share problem-solving strategies, further develop oral communication skills, as well as improve knowledge and gain competence and confidence in the subject matter.	2	2	0	2	2	0
2	Students and peer leaders will participate in the PLTL program learning experiences that promote a strong sense of community among their peers and employees at SJCC to increase learning, retention, success, and persistence.	2	2	2	2	2	2
3	Students will develop mentee-mentor relationship with well-trained peer leaders to improve the efficacy of student success, connect students to the college community, help students develop an awareness of their own learning style and, navigate students towards campus resources.	2	0	0	2	0	0
4	Students who become peer leaders will undergo continuous training beginning with a two-day orientation prior to the semester and followed by weekly leader training meetings during the semester to gain team-building and leadership skills as well as instructions in group dynamics.	2	2	2	2	2	2

		A	B	C	D	E	F
5	Student will be provided access to PLTL instructional materials and appropriate technology to learn the subject matter and earn their workshop grade.	2	2	0	2	2	0
6	Equitable access is provided to students and peer leaders to participate in the PLTL program learning experiences. Additionally, students will learn strategies for empowering themselves to become active responsible learners that benefit both their personal and professional lives.	2	2	2	2	2	2

PSLO ID	Metas Program SLOs	A	B	C	D	E	F
1	Students will actively engage with peers by participating in peer facilitated supplemental learning activities in one-on-one or group settings to improve knowledge of a subject or skill.	2	2	0	2	2	0
2	Students will have access to individualized student coaching, a form of college mentoring that improves the efficacy of student, connects them to the college community, and helps them identify resources on campus.	2	0	0	2	2	0
3	Students will develop and complete an educational plan.	0	0	0	2	0	0
4	Students will have attended to study skills and financial literacy workshops and be able to apply newly acquired learning strategies and skills in their courses and other academic endeavors.	2	2	0	2	0	0
5	Student will be able to access instructional materials and technology necessary to complete their academic task.	0	0	0	0	2	0
6	Students will participate in learning experiences that build community among students, between students and their teachers, and among faculty members and disciplines to increase learning, retention, and success.	2	2	2	2	2	2

The mapping is appended in Attachment 2.

PROGRAM IMPROVEMENT/ANALYSIS AND ASSESSMENT

How are Student Learning Outcome (SLO) assessments and campus-based research data utilized to improve instruction?

The PLTL program recently developed a research and evaluation framework/design that lists: (1) PLTL PSLOs and related Metas program SLOs, SJCC strategic goals, and/or SJCC ISLOs; (2) expected outcome(s); (3) how the outcome(s) will be assessed; and (4) criteria for determining outcome success (see appendix). This framework/design is being used to assess the effectiveness of the PLTL program and the degree to which the goals and outcomes have been achieved.

Assessment results currently available for outcomes specified in the framework/design are summarized in a parallel document (see Attachment 3). These results show the following:

Table I.8

PLTL SLOs	Assessment Results	Attainment Level	Reason (if not met)

PLTL SLO 1. Students will actively engage in a small group setting by participating in student peer-leader facilitated workshops to acquire and share problem-solving strategies, further develop oral communication skills, as well as improve knowledge and gain competence and confidence in the subject matter.	PLTL Participation rates:
	Fall 2011
	  Overall = 22%
	  CHEM 15 = 1%
	  CHEM 32A = 25%
	  CHEM 32B = 76% *
	Spring 2012
	  Overall = 28%
	  CHEM 1A = 12%
	  CHEM 15 = 1%
	  CHEM 32A = 60% *
	  CHEM 32B = 87% *
	* = met assessment criterion
		Needs partially met	Lack of participation by some faculty in this optional program.

PLTL SLO 2. Students and peer leaders will participate in the PLTL program learning experiences that promotes a strong sense of community among their peers and employees at SJCC to increase learning, retention, success, and persistence.	1A. Retention rates:
	  Fall 2011:
	    PLTL = 94%
	  <u>Non-PLTL = 78%</u>
	    Difference = 16%
	  Spring 2012:
	    PLTL = 95%
	  <u>Non-PLTL = 74%</u>
	    Difference = 21% *
	1B. Success rates:
	  Fall 2011:
	    PLTL = 83%
	  <u>Non-PLTL = 61%</u>
	    Difference = 22% *
	  Spring 2012:
	    PLTL = 81%
	  <u>Non-PLTL = 66%</u>
	    Difference = 15%
	1C. Persistence rates: not available
	* = met assessment criterion
		Needs partially met	?

PLTL SLO 3. Students will develop mentee-mentor relationship with well trained peer leaders to improve the efficacy of student success, connect students to the college community, help students develop an awareness of their own learning style and, navigate students towards campus resources.	Fall 2012 PLTL Student Survey results show average rating of PLTL participants greater than non-participants regarding knowledge of how to get assistance when needed, interaction with classmates about subject matter, sharing resources, and classmates providing assistance	Needs partially met	Awaiting additional data to determine the degree to which the goal is met
PLTL SLO 4. Students who become peer leaders will undergo continuous training	Preliminary results of focus group results with fall 2012 PLTL participants showed increased skills and comfort in working as a	Needs partially met	Awaiting additional data to determine the

beginning with a two-day orientation prior to the semester and followed by weekly leader training meetings during the semester to gain team-building and leadership skills as well as instructions in group dynamics.	team with others, communicating orally (including presentations), and directing their own learning		degree to which the goal is met
PLTL SLO 5. Students will be provided access to PLTL instructional materials and appropriate technology to learn the subject matter and earn their workshop grade.	Textbook, graphing calculators, and other supplemental learning materials are available during workshop to all student participants and accessible daily to faculty and peer leaders for workshop preparation	Needs met	
PLTL SLO 6. Equitable access is provided to students and peer leaders to participate in the PLTL program learning experiences that promotes a strong sense of community among their peers and employees at SJCC to increase learning, retention, success, and persistence.	PLTL v. all chemistry students (includes non-PLTL courses) for fall 2011 + spring 2012 by ethnicity are similar except: Filipino: PLTL (10%) greater than total (6%) Latino: PLTL (32%) greater than total (27%) Asian: PLTL (24%) less than total (34%)	Needs partially met	Need to conduct further study regarding reasons for differences

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[1]The Metas Program provides student support services and resources integrated between the Academic Affairs' Division and Student Affairs' Division to promote student learning, retention, persistence and success. Metas offers a broad range of services including counseling, one-on-one tutoring, small group peer-assisted learning workshops in math and science, study skills workshops, scholarship workshops, learning community courses, textbook and calculator loans, and a high school to college summer bridge. The Spanish word *metas* translates to "goals" and is the motto adopted for this program to increase the graduation and transfer rates of students at SJCC as notable Hispanic-Serving Intuition. The SJCC Metas Program was established through the U.S. Department of Education's Developing Hispanic-Serving Institutions Grant. The Title V: HSI Grant is described by the U.S. Department of Education as follow: "The Hispanic-Serving Institutions (HSI) Program provides grants to assist HSIs to expand educational opportunities for, and improve the attainment of, Hispanic students. The HSI Program grants also enable HSIs to expand and enhance their academic offerings, program quality, and institutional stability."

[2] Since the conference presentation and beginning in December of 2012, Dr. Christopher Myers of Applied Research and Evaluation was hired as an independent contractor to develop a research framework to closely assess the effectiveness of the PLTL program. Thus, we expect further improvements in tracking enrollment by the fall of 2013, as PLTL the program undergoes an extensive research project led Dr. Christopher Myers. This research includes an assessment of programmatic features such as current methods of data collection to track student enrollment. We are also utilizing SARS GRID this spring 2013 semester.

[3]Arendale, D. (2007). (a) *Annotated bibliography of postsecondary peer cooperative learning programs*.Unpublished manuscript, College of Education and Human Development, University of Minnesota.Retrieved July 1, 2007,

from http://www.tc.umn.edu/~arend011/Peerbib03.pdf and (b) Arendale, D. (2004). Pathways of persistence: A review of postsecondary peer cooperative learning programs. In I. M. Duranczyk, J. L. Higbee, & D. B. Lundell (Eds.), *Best practices for access and retention in higher education* (pp. 27-42). Minneapolis, MN: Center for Research on Developmental Education, General College, University of Minnesota. Retrieved March 15, 2005, from http://education.umn.edu/CRDEUL/monographs.html
[4]http://www.pkal.org/documents/Vol4PeerLedTeamWorkshop.cfm; http://www.pkal.org/documents/Vol4PeerLedTeamLearningPedagogies.cfm

[5]**PLTL Program Student Learning Outcomes (PSLOs).**

1. Students will actively engage in a small group setting by participating in student peer-leader facilitated workshops to acquire and share problem-solving strategies, further develop oral communication skills, as well as improve knowledge and gain competence and confidence in the subject matter.
2. Students will develop mentee-mentor relationship with well trained peer leaders to improve the efficacy of student success, connect students to the college community, help students develop an awareness of their own learning style and, navigate students towards campus resources.
3. Students who become peer leaders will undergo continuous training beginning with a two-day orientation prior to the semester and followed by weekly leader training meetings during the semester to gain team-building and leadership skills as well as instructions in group dynamics.
4. Student will be provided access to PLTL instructional materials and appropriate technology to learn the subject matter and earn their workshop grade.
5. Equitable access is provided to students and peer leaders to participate in the PLTL program learning experiences that promotes a strong sense of community among their peers and employees at SJCC to increase learning, retention, success, and persistence.

[6] A comprehensive list, spanning more than a decade of peer leader co-presentations can be provided upon request.

To fulfill our commitment to teaching excellence and assist students acculturate to academic life, narrowing the achievement gaps (particularly in STEM courses), establishing a set of benchmarks with high standards, addressing multifarious learning styles, upholding a respectable code of conduct, developing a robust research and evaluation plan, advance their education and achieve employment we pride ourselves in creating an environment that both challenge and prepare individuals for successful careers. We foster a student body that actively participates in a diverse, global society. SJCC offers a multitude of programs and assistance to enable students achieve their education and employment goals while cultivating an environment that empowers students with academic and personal skills that promote active, responsible learners.

[7]On Course Student Success Strategies for empowering students to become active, responsible learners.http://www.oncourseworkshop.com/
[8]Jacques, David. Learning in Groups. Third ed. London: Croom Helm, 2001.