

Attitude Survey Results: PLC and Control Groups
Pre- and Post-Treatment Attitudes and Opinions
AY 2002-2003 Davis Project
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In 2001-02, WPI began experimenting with a “Project-based Learning Community (PLC)” in which roughly two dozen first-year students took their first physics, Calculus and humanities courses in an integrated team- and project-based mode. The 2001-02 experiment, supported by the Davis Educational Foundation, worked well enough that in 2002-03, two sections were offered.

The PLC offerings were intended to address the concerns WPI first-year students expressed in the 2001 and 2002 NSSE surveys that, relative to first-year peers at other Association of Independent Technological Universities, they were having fewer opportunities for active and collaborative learning, and were less challenged than they expected to be in the first year in college.

Results of comparisons between 2002 - 2003 Davis PLC and Control students reveal that, when compared to Control students, members of the 2002 - 2003 Davis PLC Program attached more importance to improving their problem-solving abilities and reasoning skills, and reported having made more progress at each of the following:

- improving their problem-solving abilities and reasoning skills
- learning how to think and reason
- understanding and applying math concepts
- learning to create professional-quality reports.

Interesting results are also presented about the very different responses of students in the two PLC sections, which may be accounted for by the different circumstances behind the recruitment of the two sections. Overall results suggest that the PLC program is valued differently by different students.

The offering of the second PLC section in 2002-03 was partly funded by the NEASC IAP project, as part of WPI’s commitment to use outcomes assessment to identify and address weaknesses in the WPI curriculum.

DESCRIPTION OF PROJECT-BASED LEARNING COMMUNITY (PLC)¹

General features of PLC

The PLC is a program offered to first-year WPI students that blends Physics, Math, and Humanities together in a unified learning experience constructed around group projects, outcomes measures, and internet resources and technologies (principally Maple and PowerPoint). This option is offered to students as a way to master fundamental knowledge and simultaneously begin the group project approach to learning that is distinctive to degree requirements at WPI.

For consideration for membership in the PLC, students are required to enroll in the following PLC-instructor-led courses for both A- and B-terms: introductory Math, introductory Physics, and Humanities.

For the Humanities portion of the course, students work in groups on 6 different projects that are designed, whenever possible, to incorporate ideas and concepts from Math and Physics. For each project, students produce a written report and an oral presentation utilizing PowerPoint.

PLC class meetings are characterized by discussions between faculty and students a free exchange of ideas. Students are encouraged to consult with one another on assignments. Calculus quizzes are designed around outcomes “gates,” and students are permitted to re-take failed Calculus quizzes and Physics exams. Physics and Calculus homework is not collected.

Aside from Physics lecture, PLC students attend all conferences and class meetings in a private room to which students have access 24 hours per day, 7 days per week.

Special characteristics and issues of the 2002 - 2003 PLC offering

For the offering in the 2002 - 2003 academic year, students enrolling in PLC were assigned to one of two possible sections of the course. Section 1 was led by the same three professors for both A- and B-terms, each of whom had previously participated in variations of the program. Section 2 A-term was led by three professors, one of whom had previously participated in variations of the program. Due to difficulties the Physics department had with obtaining coverage for another non-PLC class for B-term, the Section 2 A-term Physics professor was replaced with another Physics professor for B-term.

Each PLC section had its own private room within which they met and worked. The sections communicated very infrequently with each other. Although students were granted access to the rooms 24 hours per day, 7 days per week, technical difficulties interfered with students’ ability to use their identification cards to gain electronic access to the rooms at will.

Because rooms were not ready for students until the middle of the second week of A-term, PLC sections met in various locations for the first week and a half of classes. The rooms were furnished with the following: tables, chairs, wireless classroom networking, several computers, and white boards (although installation of computers and white boards

¹ Portions of this description were obtained from various printed sources and through personal communications with those who contributed to the design, development, and operation of the PLC.

was not completed until week 5 of A-term). In B-term, PLC students were also given laptops for their personal use (for the remainder of the PLC).

PLC students also received additional support in the classroom from Teaching Assistants (TAs) and Peer Learning Assistants (PLAs)².

² PLAs are undergraduate students hired to mentor and assist students in specific courses.

EXECUTIVE SUMMARY

A pre-intervention survey and a post-intervention survey were electronically administered to students in the 2002 - 2003 Davis Project-Based Learning Community (PLC) and to a control group to quantitatively assess the effects of the program and to examine any potential differences between the experiences of PLC Section 1 and PLC Section 2 students. All first-year students were invited to take the pre-survey during orientation activities, before the PLC began. All students who had completed the pre-survey were invited to take the post-survey during the first week and a half of C-term in January 2003, after the PLC had ended. Of those completing both surveys, 17 were PLC students (9 were from Section 1 and 8 were from Section 2) and 14 were Control students.

The analyses examined differences between the PLC and Control groups, differences between PLC Section 1 and PLC Section 2, and also within-group changes for the PLC group, each section of PLC students, and the Control group. There were baseline differences between the PLC and Control groups and also between PLC Section 1 and PLC Section 2.

Results of comparisons between 2002 - 2003 Davis PLC and Control students reveal that, when compared to Control students, members of the 2002 - 2003 Davis PLC Program attached more importance to improving their problem-solving abilities and reasoning skills, and reported having made more progress at each of the following:

- improving their problem-solving abilities and reasoning skills
- learning how to think and reason
- understanding and applying math concepts
- learning to create professional-quality reports.

The data indicate that the focus the PLC had on both group work and project work was key to the success of the program. Analyses revealed that, in comparison to Control students, PLC students not only encountered significantly more project work and significantly more group work during A- and B-terms, but they also more greatly valued each and believed more strongly that each aided their learning. And each of the above conclusions can be linked to these facts.

The following absolute aspects of the data reinforce the success of the PLC program:

- In no instance did the Control students' survey responses reveal that they had made more progress than the PLC students had made in any particular area.
- In no instance did the Control students' survey responses indicate that they held attitudes that were more in line with the goals of the PLC than the PLC students' attitudes were.

It is obvious from comparisons between the PLC students and Control students that the PLC is a valuable program that effectively meets the needs of a segment of the class of first-year students. However, analyses examining both change within the PLC group and differences between PLC Section 1 and PLC Section 2 indicate that the PLC may not always have succeeded at achieving its aims, and they also reveal that the PLC experience was different for different students.

Taking into account the many and important differences between the PLC Section 1 and PLC Section 2 students that were present at the beginning of the PLC, analyses show that the PLC students from each section left the program with attitudes that were quite different from each other. On the post-survey, when compared to Section 1 students, Section 2 students attached more importance to attaining the following outcomes:

- understanding and applying math concepts
- applying scientific knowledge and skills
- locating, screening, and organizing information
- improving problem-solving abilities and reasoning skills
- becoming more self-reliant.

Additionally, when compared to Section 1 students, Section 2 students

- more strongly believed that taking courses that are connected or related in some way aids their learning
- more strongly believed that working with other students or friends from their classes aids their learning
- more strongly valued working on their own.

Informal conversations with those involved with populating and running the PLC and personal observations have indicated that the following issues may be worth investigating when trying to make sense of why the students from each PLC section had such different experiences:

- number of “early joiners”/number of “late joiners”
- gender ratio in sections and in teams
- organization/stability of the PLC environment at the beginning of A-term
- style of PLC professors from each section
- continuity of PLC professors from A- to B-terms
- goodness of fit between students’ approaches to learning and PLC philosophy/goals
- degree to which students are “locked-in” to a project team
- extent to which a student felt as if he or she had a choice to enroll in PLC.

Efforts are currently underway to determine what other issues may have contributed to creating such different experiences for students in each of the PLC sections.

METHOD

Procedure

Instruments

Two surveys were used to quantitatively assess the effects of the 2002 - 2003 Davis PLC: a pre-intervention survey, referred to herein as the “pre-survey”; and a post-intervention survey, referred to herein as the “post-survey.” The items on the surveys were designed to assess student opinions and attitudes about the following areas:

- course connections
- oral, written, and general communication
- problem solving
- teamwork
- motivation to succeed academically
- personal development
- professional skills development.

Additionally, other items on the post-survey were designed to assess the following:

- students’ perceptions of their own progress in some of the above areas
- the extent to which students developed connections with WPI
- the extent to which students encountered various types of learning situations that academic year
- the extent to which students valued these same learning situations
- the extent to which students believed that these same learning situations aid their learning.

To best understand the effects of the 2002 - 2003 PLC Program, the data generated from these surveys have been analyzed in the following ways:

- PLC group vs. Control group – pre- and post-survey differences
- PLC Section 1 group vs. PLC Section 2 group – pre- and post-survey differences
- PLC within-group change between the pre- and post-surveys
- PLC Section 1 within-group change between the pre- and post-surveys
- PLC Section 2 within-group change between the pre- and post-surveys
- Control within-group change between the pre- and post-surveys.

The purpose of examining differences between the PLC group and the Control group was to determine the effects that the PLC program had on PLC students in relation to the effects that traditional coursework had on Control students. The purpose of examining differences between PLC Section 1 and PLC Section 2 was to determine whether the experiences of the Section 1 students and Section 2 students differed from each other. The purpose of examining within-group change for each group was to determine whether changes occurred for the students of any group, relative to themselves.

Some items on the surveys were created by the Center for Educational Development, Technology, and Assessment and others were either extracted or adapted from The ACT Evaluation/Survey Service’s “College Outcomes Survey” or “College

Student Needs Assessment Survey.” Permission was obtained from ACT for the use of all extracted or adapted items, and appropriate fees were paid. Appendix A is a hard copy of the document on which the electronic pre-survey was based. Appendix B is a hard copy of the document on which the electronic post-survey was based.

Sample selection

PLC group

The criteria a student was required to meet for participation in the PLC included enrollment (or anticipated enrollment) in introductory Math (MA 1021) for A-term and its continuation (MA 1022) in B-term plus introductory Physics (PH 1110) for A-term and its continuation (PH 1120) in B-term. Recruitment was limited to students enrolling in introductory Math and introductory Physics courses for two reasons:

- one goal of the Davis Project is to improve retention of first-year students, and the majority of WPI’s non-returning first-year students begin their studies by enrolling in introductory Math (MA 1021)
- the PLC was designed around topics that would relate well to topics covered in introductory Math and introductory Physics courses.

Student recruitment for the 2002 - 2003 Davis PLC began via ground mail in late May/early June 2002, before classes began, through a program planning guide called “Blueprint for Success” that was sent to all incoming first-year WPI students. The program planning guide is a booklet designed to aid incoming students in selecting courses. The booklet included a section called “The Project-Based Learning Community Option” that described the PLC and informed students of the procedure for enrolling in the PLC. A version of the text of “The Project-Based Learning Community Option” that was obtained from a related website may be found in Appendix C.

Because not enough students to fully populate two PLC sections initially expressed interest in the program, one of the PLC faculty members sent a solicitation letter to those students who had not already declared interest but who had registered for MA 1021, PH 1110, and a Humanities and Arts course for A-term. Additional recruitment efforts continued during on-campus orientation for first-year students and included the following: testimonials given by former PLC students (students from an earlier version of the program known as the “Tutorial”) during a Physics talk to first-year students, an “open forum” given by members of the Office of Academic resources, and personal suggestions to potentially appropriate students from members of the Office of Academic Resources and the Office of Academic Advising.

When enrollment information for the PLC was obtained a few weeks into B-term, 44 first-year students (35 males and 9 females) were identified as having been members of the PLC for both A- and B-terms. Of these 44 students, 23 (20 males and 3 females) were members of Section 1 and 21 (15 males and 6 females) were members of Section 2. Informal communications with those involved with populating the PLC sections revealed that Section 1 had been populated with more students who had expressed an interest in the program early on, and Section 2 had been populated with more students who had expressed interest in the program much closer to the beginning of classes.

In addition to these students, one other male was also identified as having joined the PLC in B-term, but he was excluded from all survey analyses because he had not

been a PLC member for both A- and B-terms. (However, the additional male who joined in B-term was taken into consideration when selecting the Control group because it was believed that his data would be relevant to grade analyses that were to be conducted for B-term data.) Another two males were identified as having been enrolled in PLC but, because they were also identified as transfer students, were excluded from all analyses. Several students who had joined PLC at the beginning of the year and who subsequently left for various reasons were excluded from all analyses. All participants in the 2002 - 2003 experimental group of Davis PLC knowingly participated.

Control group

When selecting the Control group for the 2002 - 2003 Davis PLC, efforts were made to select a group with a course enrollment and gender profile that was as similar as possible to the 2002 - 2003 Davis PLC students. The PLC students were enrolled in the following courses: introductory Math (MA 1021) for A-term and its continuation (MA 1022) in B-term, introductory Physics (PH 1110) for A-term and its continuation (PH 1120) in B-term, and a Humanities course in both A- and B-terms. Therefore, members of the Control group were selected from a pool of students who met the following criteria:

- enrollment in the introductory Math course (MA 1021) for A-term
- enrollment in the introductory Physics course (PH 1110) for A-term (excluding students enrolled in a section believed by some to have had an exceptionally strong, and non-traditional, emphasis on group work)
- enrollment in the continuation course for introductory Math (MA 1022) for B-term
- enrollment in the continuation course for introductory Physics (PH 1120) for B-term.

Additionally, students who met the above criteria and also were enrolled in any Humanities and Arts course³ for both A- and B-terms or for only A-term were given preference for selection because their course loads mirrored those of the PLC students more closely than did those of students not taking Humanities and Arts courses.

The Control group was selected based on enrollment information that was obtained from the WPI Registrar a few weeks into B-term. At the time the Control group was selected, records indicated that there were 17 students who had enrolled in all of the following courses: non-PLC sections of MA 1021 and qualifying sections of PH 1110 for A-term, non-PLC sections of MA 1022 and non-PLC sections of PH 1120 for B-term, and qualifying Humanities courses for both A- and B-terms. All of these students were included in the Control group (15 males and 2 females). At the time the Control group was selected, records indicated that there were 7 students enrolled in all of the following courses: non-PLC sections of MA 1021 and qualifying sections of PH 1110 for A-term, non-PLC sections of MA 1022 and non-PLC sections of PH 1120 for B-term, and a qualifying Humanities course for A-term. All of these students were also included in the Control group (5 males and 2 females). At the time the Control group was selected, records indicated that there were 49 students enrolled in the following courses: non-PLC

³ A qualifying Humanities and Arts course was a course from one of the following areas: History, English, Theatre, Rhetoric, Philosophy, Religion, Writing, Art History, or Humanities.

sections of MA 1021 and qualifying sections of PH 1110 for A-term and non-PLC sections of MA 1022 and non-PLC sections of PH 1120 for B-term. Of these students (40 males and 9 females) only 16 males and 5 females were needed to obtain a Control group that was matched for gender with the PLC group. Out of this group 16 males and 5 females were randomly chosen to complete the Control group. The Control group consisted of a group of 45 students who were gender-matched with the PLC students (36 males and 9 females).

Assessing baseline academic equality of the PLC and Control groups

The baseline academic equality of the groups was established through a comparison of SAT verbal and SAT math scores for the two groups through the use of *t*-tests. For SAT verbal scores, there was no significant difference between the PLC group ($M = 585.91$, $SD = 71.80$) and the Control group ($M = 578.64$, $SD = 84.48$), $t(86) = .44$, $p = .665$). For SAT math scores, there was no significant difference between the PLC group ($M = 651.59$, $SD = 65.63$) and the Control group ($M = 637.27$, $SD = 59.12$), $t(86) = 1.08$, $p = .285$).

Survey administration

Both the pre- and post-surveys took the form of electronic web-based surveys. All students were informed that their standing at WPI would not be affected by their decision either to participate or not participate in the surveys. All students were further informed that if they chose to participate, all information they provided would remain confidential.

During orientation activities, Orientation Leaders invited all first-year students to take the pre-survey. Students were offered Insight points in exchange for taking the survey, and were also told that any orientation group that had all students completing the survey within 24 hours would receive additional points for their group. The last date that pre-survey data was collected was 8/26/02, before classes began. (Insight is a class-wide program for first-year students that provides various forms of support to students. Insight personnel managed the process of awarding points to those completing the survey. At no point in time were Insight personnel provided with information that would enable them to link survey data with student names.)

All first-year students who had completed the pre-survey were invited to take the post-survey. An e-mail message was sent to these first-year students during the first week of C-term in January 2003. Students were offered and later paid \$20.00 cash for completing the post-survey. All post-survey data was collected between 1/9/03 and 1/19/03, the first week and a half of C-term.

Respondents

Because the analyses are designed to examine change in students as a result of the intervention, only those students completing both the pre- and post-surveys are included. Of all of the students completing both surveys, 17 were PLC students and 14 were Control students. Of the PLC students completing both surveys, 9 were from Section 1 and 8 were from Section 2.

RESULTS

The pre- and post-surveys used Likert scales of qualitative terms (e.g., strongly agree, agree, neutral, disagree, strongly disagree; see surveys in appendices to view the actual scale that was used for any specific item). For purposes of quantitative analysis, each scale position was numerically translated (e.g., strongly agree = 1, agree = 2, neutral = 3, disagree = 4, strongly disagree = 5). Numeric data are presented when referring to the results of a statistical test. However, for ease of reading and interpretation by the reader, qualitative terms are used in this report when findings are described.

When using qualitative terms to describe findings, the precision of the numeric data is lost. To assist the reader in understanding the subtleties of the data, parenthetical expressions are used to provide details about the data. The example, “. . . PLC students registered very close to “agreement” (but between “agreement” and “neutrality”) while Control students registered between “agreement” and “neutrality” (closer to “neutrality”) . . .” shows that while the average numeric responses for both groups fell between “agree” and “neutral” on the Likert scale, the PLC students’ responses were much closer to “agreement” than they were to “neutrality” while the Control students’ responses were closer to “neutrality” than they were to “agreement.”

Because the survey data were ordinal, it was necessary to use nonparametric tests for all statistical analyses. Mann-Whitney *U* tests were conducted for all comparisons between PLC and Control students and for all comparisons between PLC Section 1 and PLC Section 2 students. Wilcoxon signed ranks tests were used to measure change within each group between the pre- and post-surveys. While neither of these tests relies on measures of central tendency for their computation, the results of all statistical tests in this report are described using information about the means for each group. This was done because information on means enables the reader to more easily compare the two groups than if information on rank sums (upon which both tests rely) were provided.

This report would be quite cumbersome if the results of all statistical tests were reported in the text. Therefore, unless the results of a test that did not show a significant difference between the groups are relevant to some other aspect of the data set, they are not discussed in this paper. If a particular survey item is not discussed in the paper, it should be assumed that no significant difference existed either between the groups (on either the pre- or post-survey) or within any one group (when comparing responses between the pre- and post-surveys). The results that are discussed in this paper are those that reveal a significant difference between groups or a significant change within a group. The results of all statistical tests, both significant and not significant, may be found in Appendix D.

PLC vs. CONTROL

Pre-survey results

There were some statistically significant differences between the PLC and Control groups on the pre-survey in the following general areas: course connections, communication skills, teamwork, developing connections to WPI, and personal development. There were no pre-survey differences between the PLC and Control groups in the areas of problem solving or academic motivation.

Course connections

PLC students agreed more strongly than did Control students that courses outside of their majors would help them do better in courses in their majors ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 75.50, p = .040120$), become better at communicating ideas in their majors ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 64.50, p = .017414$), and become better at working on teams with people from other majors ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 56.00, p = .006144$). Additionally, PLC students believed more strongly than did Control students that sometimes it's better to try to solve a problem by looking for ways in which it's related to other material that might not initially seem relevant ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 13) = 40.00, p = .001657$). Specifically, regarding the opinion that courses outside of their majors would help them do better in courses in their majors, PLC students registered close to "agreement" (between "agreement" and "neutrality") while Control students registered between "agreement" and "neutrality" (slightly closer to "neutrality"). Regarding the opinion that courses outside of their majors would help them become better at communicating ideas in their majors, PLC students registered between "strong agreement" and "agreement" (slightly closer to "agreement") while Control students registered between "agreement" and "neutrality" (closer to "agreement"). Regarding the opinion that courses outside of their majors would help them become better at working on teams with people from other majors, PLC students registered between "strong agreement" and "agreement" (slightly closer to "strong agreement") while Control students registered "agreement." Regarding the statement that said that sometimes it's better to try to solve a problem by looking for ways in which it's related to other material that might not initially seem relevant, PLC student responses fell between "strong agreement" and "agreement" (close to "agreement") while Control responses fell between "agreement" and "neutrality" (closer to "neutrality").

Communication skills

On the pre-survey, PLC students attached significantly more importance to learning how to give a good oral presentation in front of a group than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 70.00, p = .040799$). PLC students attached "great" importance to it, while Control students attached only between "moderate" and "great" importance to it (closer to "moderate" importance).

Teamwork

PLC students attached more importance to learning how to be effective team members than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 60.00, p = .012447$). PLC students attached "great" to "very great" importance to it (slightly closer to "great" importance) while Control students attached "moderate" to "great" importance to it (closer to "great" importance).

Connections with WPI

PLC students were significantly more interested in making social connections with faculty at WPI than were Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 64.50, p = .018382$). PLC students rated attaining this outcome as having "great" to "very great" importance (closer to "great" importance) while Control students rated it as having only "moderate" to "great" importance (slightly closer to "great" importance).

Personal development

PLC students attached significantly more importance to attaining each of the following personal development outcomes than did Control students: valuing input from those with different backgrounds ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 71.50, p = .041910$); identifying their own personal strengths, abilities, and limitations ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 57.00, p = .006482$); and developing their understanding of standards of ethical behavior ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 58.50, p = .009139$). PLC students attached between “great” and “very great” importance (closer to “great” importance) to learning how to value input from others coming from different backgrounds while Control students attached “moderate” to “great” importance to it (closer to “great” importance). PLC students attached “great” to “very great” importance (closer to “great” importance) to identifying their own personal strengths, abilities, and limitations while Control students attached between “moderate” and “great” importance to it. PLC students attached “great” importance to developing their understanding of standards of ethical behavior while Control students attached “moderate” to “great” importance (closer to “moderate” importance) to it.

Summary of pre-survey differences between PLC and Control students

If the recruitment strategy of the PLC is to attract students who are well matched to its approach, and if the PLC is successful at doing so, then baseline differences between the PLC and Control groups should be expected. The pre-survey differences between the PLC and Control groups indicate that the students from each group entered WPI at the beginning of the 2002 - 2003 academic year with different approaches towards coursework and different needs. In general, when compared to the Control students, PLC students began their work at WPI

- believing more strongly that courses outside of their majors would benefit them
- having a greater interest in developing good oral presentation skills
- having a greater interest in becoming an effective team member
- having a greater interest in developing relationships with faculty
- having a greater interest in some aspects of personal development.

These pre-treatment differences between the groups should not be viewed as a compromise to the assessment of the PLC because the students who enrolled in the program did so on the basis of *self-selection* after they had learned the details of the program.

Post-survey results

There are many items on the post-survey for which statistically significant differences between the PLC and Control groups exist. While there was one positive and significant attitudinal shift *within* the Control group, in cases where a difference in the responses *between* the PLC and Control groups is significant, it is the responses of the PLC students that more strongly reflect the goals of the Davis PLC. In effect, the Control students – as students not receiving any of the support the PLC had offered to its students – did not realize any of the positive changes that the PLC had worked to foster in its students. (The one positive and significant attitudinal shift realized by the Control

students within their own group had not been in an area of direct concentration for the PLC, the area of developing standards of ethical behavior.)

Course connections

When compared to Control students, PLC students agreed less strongly that first-year courses are not relevant to each other ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 71.00, p = .035850$), agreed more strongly that courses outside major would help them become better at solving problems in their majors ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 52.00, p = .002855$), and reported having made more progress at understanding and applying math concepts ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 41.50, p = .001049$). PLC students “disagreed” that first-year courses are not relevant to each other while Control students registered between “disagreement” and “neutrality” on the issue. PLC students “agreed” that courses outside of their majors would help them become better at solving problems in their majors while Control students registered between “neutrality” and “agreement” (very close to “neutrality”). PLC students made between “much” and “very much” progress (closer to “much” progress) at understanding and applying math concepts while Control students made between “moderate” and “much” progress (closer to “moderate” progress).

PLC students also agreed more strongly than did Control students with the following issues, but because these findings precisely mirror those from the pre-survey, they should not be viewed as being related to the different treatment each group received: courses outside of their majors will help them do better in courses in their majors ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 46.00, p = .001672$) and sometimes it’s better to try to solve a problem by looking for ways in which it’s related to other material that might not initially seem relevant ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 75.50, p = .046532$).

Communication skills

Oral communication

On the pre-survey, when compared to Control students, PLC students gave more importance to learning how to give a good oral presentation in front of a group. This same finding existed on the post-survey ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 62.00, p = .016508$). Additionally, PLC students reported having made more progress at learning how to give a good oral presentation in front of a group than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 15.00, p = .000020$). In addition, analyses of post-survey data reveal that PLC students agreed more strongly than did Control students that they are good at giving oral presentations ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 69.50, p = .041815$) and that they are confident when doing so in front of an audience ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 65.50, p = .029422$). PLC students registered between “neutrality” and “agreement” when asked to what extent they agreed that they were good at giving oral presentations while Control students registered between “neutrality” and “disagreement” (closer to “neutrality”). PLC students also registered between “neutrality” and “agreement” when asked whether they were confident at giving oral presentations in front of an audience, while Control students registered between “neutrality” and “disagreement.” Additionally, when compared to Control student responses, PLC students reported having made more progress at learning how to clearly articulate their thoughts through speaking ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 37.50, p = .000748$). PLC students made between “moderate” and “much” progress

(closer to “much” progress) while Control students made between “moderate” and “little” progress.

Written communication

On the post-survey, when compared to Control students, PLC students reported having made more progress at learning to create professional-quality reports ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 24.50, p = .000070$). PLC students reported having made “moderate” to “much” progress (closer to “much” progress) while Control students reported having made between “moderate” and “little” progress.

Problem solving

When compared to Control students, PLC students attached more importance to improving their problem solving abilities and reasoning skills ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 59.00, p = .008257$). PLC students attached between “great” and “very great” importance (slightly closer to “very great” importance) to doing so while Control students attached only “great” importance to doing so. Additionally, PLC students reported having made more progress at improving their problem-solving abilities and reasoning skills than Control students had ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 54.00, p = .006574$). PLC students reported having made “much” progress while Control students reported having made only “moderate” to “much” progress (closer to “moderate” progress).

Another problem-solving item where PLC students excelled when compared to Control students was regarding progress made at learning to think and reason. PLC students reported having made “moderate” to “much” progress (closer to “much” progress) while Control students reported having made only “moderate” progress ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 66.00, p = .015299$).

Teamwork

On the pre-survey, PLC students attached more importance than Control students did to learning to become an effective team member. Their motivation to do this likely contributed to the statistically significantly greater amount of progress they reported on the post-survey at doing so when compared to Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 18.00, p = .000036$).

On the pre-survey, there was no difference between the groups regarding their agreement with the statement that usually a project is best accomplished by taking a team approach. On the post-survey, though, there was a significant difference between the groups for this item ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 68.00, p = .029317$). The PLC students registered close to “agreement” (between “agreement” and “strong agreement”) while the Control students registered between “agreement” and “neutrality.”

Within the PLC group there was a statistically significant decline between the pre- and post-surveys regarding the amount of importance PLC students attached to attaining the outcome of being an effective team member ($T (n = 17) = 3.00, p = .020886$). On the pre-survey, they attached “great” to “very great” importance to it (slightly closer to “great” importance) but on the post-survey they attached only “moderate” to “great” importance to it (closer to “great” importance).

To clarify how this finding could have occurred wherein there was no significant post-survey difference between the PLC and Control groups while there was a significant

internal change for the PLC group: The post-survey difference between the PLC and Control groups was more subtle than was the pre-survey to post-survey change that occurred within the PLC group. On the post-survey, both the PLC and Control groups attached “moderate” to “great” importance (closer to “great” importance) to attaining the outcome of being an effective team member, and the difference between the group was not significant ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 109.00, p = .677952$). The change within the PLC group, though (from between “great” and “very great” (slightly closer to “great”) on the pre-survey to between “moderate” and “great” (closer to “great”) on the post-survey), was large enough that it was statistically significant.

Academic motivation

There were no differences between the groups regarding issues of academic motivation, but there was a statistically significant change between the pre- and post-surveys in the extent to which Control students were motivated by external factors ($T (n = 14) = 0.00, p = .043123$). On the pre-survey, Control students indicated that the degree to which they would try to excel academically at WPI because they wanted to please their parents or because they enjoyed the praise and admiration from their instructors and/or peers was “moderately.” On the post-survey, though, this response had changed to between “moderately” and “very much” (slightly closer to “very much”) indicating that their incentive for succeeding due to external motivators had strengthened. This is a non-beneficial finding as the better educational outcome would be for students to have become more *intrinsically* motivated.

To clarify how this finding could have occurred wherein there was no significant post-survey difference between the PLC and Control groups while there was a significant internal change for the Control group: The post-survey difference between the PLC and Control groups was more subtle than was the pre-survey to post-survey change that occurred within the Control group. On the post survey, both the PLC and Control students responded between “moderately” and “very much.” Even though the PLC responses were closer to “moderately” while the Control responses were closer to “very much,” the difference was not statistically significant ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 89.00, p = .217958$). The change within the Control group, though (from “moderately” on the pre-survey to between “moderately” and “very much” (slightly closer to “very much”) on the post-survey), was great enough that it was statistically significant.

Connections with WPI

The only post-survey differences between the PLC and Control students regarding connections with WPI involved items for which a similar and related difference existed on the pre-survey. On the pre-survey, PLC students attached more importance to making social connections with faculty at WPI, and this same difference was also seen on the post-survey ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 72.50, p = .049751$) along with a report of having made more progress at having done so, when compared to Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 35.00, p = .000476$).

Oddly, within the PLC group, the importance that students attached to making social connections with faculty significantly declined between the pre- and post-surveys ($T (n = 17) = 4.00, p = .049959$). On the pre-survey, PLC students attached “great” to “very great” importance (closer to “great” importance) to making social connections with

faculty, but on the post-survey they attached close to only “great” importance (between “moderate” and “great”) to it.

Personal development

The only post-survey differences between the PLC and Control students regarding personal development involved items for which a similar and related difference existed on the pre-survey. On the pre-survey, PLC students attached more importance to valuing input from those with different backgrounds, and this same difference was seen on the post-survey ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 67.50, p = .030448$). Also, when compared to Control students, PLC students reported having made more progress at valuing input from those with different backgrounds ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 62.50, p = .021192$).

PLC students showed a small but statistically significant decline in the importance they attached to managing their time more effectively ($T (n = 17) = 0.00, p = .027715$). On the pre-survey, they attached between “great” and “very great” importance (slightly closer to “very great” importance) to it while on the post-survey they attached only “great” importance to it.

Control students showed a statistically significant increase in the importance they attached to developing their standards of ethical behavior ($T (n = 14) = 0.00, p = .017966$). On both surveys, their responses were between “moderate” and “great,” but on the pre-survey, responses were closer to “moderate” and on the post-survey responses were closer to “great.”

Learning situations

The items on the post-survey dealing with learning situations were used to explore student experiences with, and opinions about, fourteen different learning situations (large lecture classes, small lecture classes, small discussion classes, project work in classes, group work in classes, Teaching Assistants, Peer Learning Assistants, tutoring by MASH leaders, individual consultation with faculty, working on their own, taking courses that are connected or related in some way, taking multiple courses with the same group of students, working with other students or friends from their classes, and working in an atmosphere that allows them flexibility to approach learning in ways that suit them). Specifically, these items assessed the extent to which students encountered these situations, valued them, and believed they aid their learning. These items had not been included on the pre-survey because it was assumed that students would not be familiar with them either at all or perhaps not in the same ways they would after having been WPI students for two terms. For instance, it was highly unlikely that an incoming student would know what a MASH leader was and it was also unlikely that a student’s group work in classes from high school would resemble his or her experiences with group work in classes at WPI.

Small discussion classes

During A- and B-terms of their first-year, when compared to Control students, PLC students encountered small discussion classes significantly more frequently ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 51.00, p = .002949$). PLC students encountered them in “3 or 4 courses” while Control students encountered them in only “1 or 2 courses.” The greater frequency with which PLC students encountered them may have contributed to the

greater value they placed on them. PLC students valued small discussion classes between “much” and “very much” while Control students valued them only “moderately” to “much” (closer to “much”) ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 61.50, p = .014567$).

Project work in classes

Regarding project work in classes: For A- and B-terms of their first-year, PLC students encountered it significantly more often than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 16.00, p = .000044$) with PLC students encountering it in between “3 or 4 courses” and “5 or 6 courses” (closer to “3 or 4 courses”) and Control students encountering it between “not at all” and in “1 or 2 courses.” The increased contact with project work likely encouraged the PLC students to have more positive attitudes towards it. When compared to Control students, PLC students valued it significantly more ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 45.50, p = .001863$) and believed significantly more that it aids their learning ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 51.50, p = .004755$). PLC students attached between “moderate” and “much” value (closer to “much” value) to project work while Control students attached only between “little” and “moderate” value (closer to “moderate” value) to it. PLC students believed that project work in classes aids their learning between “moderately” to “much” (closer to “much”) while Control students believed it aids their learning “moderately” to “little” (closer to “moderately”).

Group work in classes

The findings for group work in classes are similar to those for project work in classes: PLC students encountered it significantly more often than Control students did ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 14.50, p = .000015$), they valued it significantly more ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 49.00, p = .004059$), and they believed it aids their learning significantly more ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 41.00, p = .001018$). PLC students encountered group work in classes during A- and B-terms of their first-year between “3 or 4 courses” and “5 or 6 courses” (slightly closer to “5 or 6 courses”) and Control students encountered it in about “1 or 2 courses.” PLC students attached close to “much” value (between “moderate” and “much” value) to it while Control students attached only between “little” and “moderate” value (closer to “moderate” value) to it. PLC students believed it aids their learning “much” while Control students believed it aids their learning only close to “moderately” (between “moderately” and “little”).

Teaching Assistants

While there were no significant differences between the extent to which the two groups encountered Teaching Assistants, PLC students value them significantly more than do Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 66.50, p = .049646$), and they also believe they aid their learning to a greater degree than Control students do ($U (n_{\text{PLC}} = 16, n_{\text{Control}} = 14) = 61.00, p = .027247$). PLC students valued TAs “moderately” to “much” while Control students valued them only “moderately” to “little” (closer to “moderately”). PLC students believed TAs aid their learning “moderately” to “much” while Control students believed they aid their learning “moderately” to “little” (slightly closer to “moderately”).

Peer Learning Assistants

During A- and B-terms of their first-year, when compared to Control students, PLC students encountered PLAs significantly more often ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 34.50, p = .000434$). PLC students encountered them in “3 or 4 courses” while Control students encountered them between “not at all” and in “1 or 2 courses.” PLC students also valued PLAs significantly more than Control students did ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 42.00, p = .001204$), and they believed significantly more than Control students did that PLAs aid their learning ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 36.50, p = .000629$). PLC students valued PLAs “moderately” to “much” while Control students valued them “moderately” to “little.” PLC students believed PLAs aid their learning “moderately” to “much” (slightly closer to “much”) while Control students believed PLAs aid their learning “moderately” to “little” (closer to “little”).

Individual consultation with faculty

PLC students encountered individual consultation with faculty significantly more often than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 59.50, p = .011161$), and they believed it aids their learning to a greater degree than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 73.50, p = .049934$). PLC students encountered individual consultation with faculty “little” to “moderately” (closer to “moderately”) while Control students encountered it only “little.” PLC students believed it aids their learning between “much” and “very much” while Control students believed it aids them “much.”

Working with a consistent group of students

While PLC students encountered taking multiple courses with the same group of students significantly more frequently than did Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 38.50, p = .000591$), there were no significant differences between the two groups regarding the extent to which they valued this or the extent to which they believed it aids their learning. PLC students encountered this learning situation in between “3 or 4 courses” and “5 or 6 courses” (closer to “5 or 6 courses”) while the Control students encountered it in between “1 or 2 courses” and “3 or 4 courses” (closer to “3 or 4 courses”).

Working with other students or friends

While the PLC students encountered working with other students or friends from their classes significantly more frequently than did the Control students ($U (n_{\text{PLC}} = 17, n_{\text{Control}} = 14) = 49.00, p = .002619$), there were no significant differences between the two groups regarding the extent to which they valued this or the extent to which they believed it aids their learning. PLC students encountered this learning situation in between “3 or 4 courses” and “5 or 6 courses” (closer to “5 or 6 courses”) while the Control students encountered it in between “1 or 2 courses” and “3 or 4 courses” (closer to “3 or 4 courses”).

Summary of post-survey findings for PLC and Control students

When noting post-survey differences between PLC and Control students for which PLC students performed better than Control students, and for which corresponding pre-survey differences had already existed, it is not possible to attribute credit to the PLC

for having influenced any of the conditions leading to the differences between the groups. What can be said, though, for the following areas in which PLC students performed better on the post-survey than did Control students is that PLC students had appeared pre-disposed to holding these beliefs or succeeding in these areas and the PLC apparently did not prevent them from doing so:

- believing more strongly that courses outside of their majors would benefit them
- believing that looking for interconnections between courses and seemingly unrelated material could prove beneficial
- developing good oral presentation skills, and developing confidence at delivering oral presentations
- becoming an effective team member
- making social connections with faculty
- valuing input of those with different backgrounds.

An examination of findings within each group, however, provides some clarification regarding the above interpretation. Between the pre- and post-surveys within the PLC group, there were statistically significant *declines* regarding the amount of importance PLC students attached to becoming effective team members and to making social connections with faculty members. It may have been the case that these declines were consequences of PLC students having achieved their goals of becoming effective team members and making connections with faculty members, but they could have resulted from negative experiences in the PLC. Unfortunately, it is not possible to further investigate this issue with the PLC students.

The areas in which it is possible to state that it was likely that the PLC positively affected students are those areas for which no negative changes occurred within the PLC group and for which no differences had existed between the PLC and Control groups on the pre-survey. The following positive post-survey findings appear to be related to the differences in experiences that PLC and Control students had. When compared to Control students, PLC students reported having made more progress at the following:

- learning to create professional-quality reports
- understanding and applying math concepts
- learning to think and reason
- improving their problem solving abilities and reasoning skills.

Additionally, when compared to Control students, PLC students

- attached more importance to improving their problem solving abilities and reasoning skills
- more frequently encountered, more highly valued, and more strongly believed that the following learning situations aid their learning: project work, group work, PLAs
- more frequently encountered and more highly valued small discussion classes
- more highly valued TAs and more strongly believed that TAs aid their learning (despite having encountered TAs no more frequently than Control students had).

PLC SECTION 1 vs. PLC SECTION 2

Pre-survey results

Analyses of pre-survey data comparing PLC Section 1 students with PLC Section 2 students revealed that the characters of the groups were different. When compared with Section 1 students, Section 2 students attached more importance to developing certain communication skills, seemed more predisposed to enjoying teamwork, and appeared more interested in working on some aspects of personal development. There were no pre-survey differences between the groups regarding issues related to course connections, problem solving, academic motivation, or developing connections at WPI.

Communication skills

On the pre-survey, PLC students from Section 2 attached significantly more importance than did PLC students from Section 1 to attaining each of the following outcomes: clearly articulating thoughts through writing ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 14.50, p = .024799$), clearly articulating thoughts through speaking ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 13.50, p = .019589$), and giving a good oral presentation in front of a group ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 14.00, p = .025216$). Section 2 students attached “great” to “very great” importance (closer to “great” importance) to developing writing skills while Section 1 students attached only “moderate” to “great” importance to it. Section 2 students attached “great” to “very great” importance to developing speaking skills while Section 1 students attached only “moderate” to “great” importance (slightly closer to “great” importance) to developing them. Section 2 students attached “great” to “very great” importance (slightly closer to “great” importance) to learning how to give a good oral presentation in front of a group while Section 1 students attached only “moderate” to “great” importance to doing so.

Teamwork

On the pre-survey, Section 2 students agreed more strongly than did Section 1 students that they enjoy the social aspects of working on a team ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 10.50, p = .005232$). Section 2 students registered between “agreement” and “strong agreement” (slightly closer to “strong agreement”) and Section 1 students registered between “neutrality” and “agreement” (closer to “agreement”).

Personal development

On the pre-survey, there were a number of statistically significant differences between PLC Section 1 and PLC Section 2 regarding issues of personal development. Students from PLC Section 2 attached more importance to attaining each of the following personal development outcome than did students from PLC Section 1: coping with academic difficulties they may encounter ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 8.00, p = .002169$); identifying their personal strengths, abilities, and limitations ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 14.50, p = .021433$); and valuing academic achievement ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 15.50, p = .035096$). Regarding coping with academic difficulties they may encounter: Section 2 students ascribed “very great” importance to attaining that outcome while Section 1 students ascribed “great” importance to it. Regarding identifying their personal strengths, abilities, and limitations: Section 2 students ascribed between “great” and “very great” importance (slightly closer to “very great” importance) to attaining that

outcome while Section 1 students ascribed close to “great” importance to it. Regarding valuing academic achievement: Section 2 students ascribed between “great” and “very great” importance (slightly closer to “very great” importance) to attaining that outcome while Section 1 students ascribed between “moderate” and “great” importance (closer to “great” importance) to it.

Additionally, when compared to PLC Section 1 students, PLC Section 2 students more strongly agreed with the statement “My behaviors, choices, and judgments are based on my own personal values” ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 14.00, p = .023733$). Section 2 students registered between “agreement” and “strong agreement” (slightly closer to “strong agreement”) while Section 1 students registered between “neutrality” and “agreement” (closer to “agreement”). Section 2 students also more strongly agreed than Section 1 students did that they have a well-defined goal or set of goals on which they base their lives in general ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 12.00, p = .012404$), with Section 2 students registering between “agreement” and “strong agreement” and with Section 1 students registering between “neutrality” and “agreement” (closer to “agreement”).

Summary of pre-survey differences between PLC Section 1 and PLC Section 2 students

The pre-survey differences between students in PLC Section 1 and PLC Section 2 indicate that the students from each group entered the PLC at the beginning of the 2002 - 2003 academic year with different needs and different approaches towards work. In general, when compared to the PLC Section 1 students, PLC Section 2 students began their work in the PLC with

- a greater interest in improving their ability to communicate
- a stronger predisposition towards enjoying teamwork
- a greater interest in self-improvement
- a stronger desire to value academic achievement
- a firmer “grounding” in terms of personal values and goals.

Post-survey results

Course connections

On the post-survey, PLC Section 2 students attached more importance to attaining the outcomes of understanding and applying math concepts ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 16.00, p = .026767$) and applying scientific knowledge and skills ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 11.00, p = .008174$). For understanding and applying math concepts, Section 2 students attached close to “very great” importance to it while Section 1 students attached between “great” and “very great” importance (closer to “great” importance) to it. For applying scientific knowledge and skills, Section 2 students attached between “great” and “very great” importance (closer to “very great” importance) to it while Section 1 students attached close to “great” importance (but between “moderate” and “great” importance) to it.

Communication skills

When compared to PLC Section 1 students, PLC Section 2 students reported having made more progress during A- and B-terms at expressing their own views and opinions ($U(n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 2.00, p = .000711$). Section 2 students reported

having made between “much” and “very much” progress at learning to express their own views and opinions while Section 2 students reported having made only “little” to “moderate” progress (closer to “moderate” progress) at doing so.

Problem solving

When compared to PLC Section 1 students, PLC Section 2 students attached more importance to attaining the following problem-solving-related outcomes: locating, screening, and organizing information ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 12.50, p = .015709$) and improving problem solving abilities and reasoning skills ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 12.00, p = .005986$). For locating, screening, and organizing information, Section 2 students attached between “great” and “very great” importance (slightly closer to “great” importance) to it and Section 1 students attached between “moderate” and “great” importance to it. For improving problem-solving abilities and reasoning skills, Section 2 students attached “very great” importance to it while Section 1 students attached between “great” and “very great” importance (closer to “great” importance) to it.

Teamwork

On the post-survey, just as on the pre-survey, PLC Section 2 students agreed more strongly than did PLC Section 1 students that they enjoyed the social aspects of working on a team ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 20.00, p = .037731$). Additionally, PLC Section 2 students reported having made more progress at being an effective team member than Section 1 students reported having made ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 17.00, p = .048877$). Section 2 students reported having made “much” to “very much” progress (slightly closer to “very much” progress) while Section 1 students reported having made “moderate” to “much” progress (closer to “much” progress).

Connections with WPI

PLC Section 2 students reported having made more progress at obtaining information about social activities at WPI than PLC Section 1 students reported ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 15.00, p = .033248$). Section 2 students made close to “much” progress (between “moderate” and “much” progress) while Section 1 students made close to “moderate” progress (between “little” and “moderate” progress).

Personal development

On the post-survey, when compared with PLC students from Section 1, PLC students from Section 2 attached more importance to becoming more self-reliant ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 17.00, p = .049681$), attaching between “great” and “very great” importance (slightly closer to “very great” importance) to it while PLC students from Section 1 attached only “moderate” to “great” importance (closer to “great” importance) to it. Section 2 students also reported having made more progress at developing and demonstrating confidence in themselves than did Section 1 students ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 13.00, p = .020978$). Section 2 students made “much” to “very much” progress (closer to “much” progress) while Section 1 students made “moderate” to “much” progress (closer to “moderate” progress).

Other significant differences between Section 1 and Section 2 existed on the post-survey as well, but these same, or related, differences also existed on the pre-survey.

When compared to Section 1 students, Section 2 students attached more importance to attaining the outcome of identifying personal strengths, abilities, and limitations ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 16.00, p = .041328$). Section 2 students also reported having made more progress in this area than Section 1 students had reported ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 10.00, p = .007320$). Additionally, when compared to Section 1 students, Section 2 students reported having made more progress at valuing academic achievement ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 15.00, p = .033729$).

Learning situations

There were no significant differences between students from PLC Section 1 and PLC Section 2 regarding the extent to which they encountered any learning situation. There were significant differences between the groups regarding the extent to which the students believed that two learning situations aid their learning and regarding the extent to which the students valued one of the learning situations.

Related courses

When compared to Section 1 PLC students, Section 2 PLC students more strongly believed that taking courses that are connected or related in some way aids their learning ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 12.00, p = .013955$). Section 2 students indicated that they aided their learning between “much” and “very much” while Section 1 students indicated that they aided their learning between “moderately” and “much” (slightly closer to “much”).

Working with students or friends

When compared to Section 1 PLC students, Section 2 PLC students more strongly believed that working with other students or friends from their classes aids their learning ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 14.00, p = .023440$). Section 2 students indicated that they aided their learning between “much” and “very much” (slightly closer to “much”) while Section 1 students indicated that they aided their learning between “moderately” and “much” (slightly closer to “moderately”).

Working individually

When compared to Section 1 PLC students, Section 2 PLC students more strongly valued working on their own ($U (n_{\text{Section 1}} = 9, n_{\text{Section 2}} = 8) = 18.50, p = .046731$). Section 2 students valued working on their own “much” while Section 1 students valued working on their own “moderately” to “much” (closer to “moderately”).

Summary of post-survey findings for PLC Section 1 and PLC Section 2 students

There were no significant within-group changes for either PLC Section 1 or PLC Section 2. While this statement seems to contradict the findings discussed earlier that showed significant changes between the pre- and post-surveys for some items for the PLC group as a whole, it merely indicates that subtle changes occurred within each PLC section that became more pronounced when the sections were combined to form a larger group.

When noting post-survey differences between PLC Section 1 and PLC Section 2 for which Section 2 students performed better than Section 1 students, and for which

corresponding pre-survey differences had already existed, it is not possible to attribute credit to Section 2 for having influenced any of the conditions leading to the differences between the groups. What can be said, though, for the following areas in which Section 2 students performed better on the post-survey than did Section 1 students is that Section 2 students had appeared pre-disposed to holding these beliefs or succeeding in these areas and being a member of Section 2 did not prevent them from doing so:

- expressing their own views and opinions
- enjoying the social aspects of working on a team
- being an effective team member
- identifying personal strengths, abilities, and limitations and developing and demonstrating confidence in themselves
- valuing academic achievement.

The areas for which it is possible to state that it was likely that being a member of PLC Section 2 positively affected students are those areas for which no differences had existed between Section 1 and Section 2 on the pre-survey. The following post-survey findings appear to be related to differences in the experiences of students in PLC Section 1 and PLC Section 2. When compared to Section 1 students, Section 2 students attached more importance to attaining the following outcomes:

- understanding and applying math concepts
- applying scientific knowledge and skills
- locating, screening, and organizing information
- improving problem solving abilities and reasoning skills
- becoming more self-reliant.

Additionally, when compared to Section 1 students, Section 2 students

- more strongly believed that taking courses that are connected or related in some way aids their learning
- more strongly believed that working with other students or friends from their classes aids their learning
- more strongly valued working on their own.

DISCUSSION

Results of comparisons between 2002 - 2003 Davis PLC and Control students reveal that the 2002 - 2003 Davis PLC Program was successful at achieving the following aims:

- promoting the importance of strong problem-solving abilities and reasoning skills
- helping students improve their abilities to think, reason, and solve problems
- helping students to better understand and apply math concepts
- helping students create professional-quality reports.

The data indicate that the focus the PLC had on both group work and project work was key to the success of the program. Analyses revealed that, in comparison to Control

students, PLC students not only encountered significantly more project work and significantly more group work during A- and B-terms, but they also more greatly valued each and believed more strongly that each aided their learning. And each of the above conclusions can be linked to these facts.

The following absolute aspects of the data reinforce the success of the PLC program:

- In no instance did the Control students' survey responses reveal that they had made more progress than the PLC students had made in any particular area.
- In no instance did the Control students' survey responses indicate that they held attitudes that were more in line with the goals of the PLC than the PLC students' attitudes were.

It is obvious from comparisons between the PLC students and Control students that the PLC is a valuable program that effectively meets the needs of a segment of the class of first-year students. However, analyses examining both change within the PLC group and differences between PLC Section 1 and PLC Section 2 indicate that the PLC may not always have succeeded at achieving its aims, and they also reveal that the PLC experience was different for different students. Between the pre- and post-surveys, the PLC students showed statistically significant declines regarding the amount of importance they attached to both being effective team members and to making social connections with faculty members. It is possible that the experience that the PLC students had was such that it diminished the worth of attaining both of these outcomes. It is also possible, though, that the declines in each of these areas are the consequences of students having achieved goals of becoming effective team members and making connections with faculty members, for on the post-survey they reported having made between "great" and "very great" progress at being effective team members and having made between "moderate" and "much" progress (slightly closer to "moderate" progress) at making social connections with faculty.

Taking into account the many and important differences between the PLC Section 1 and PLC Section 2 students that were present at the beginning of the PLC, analyses show that the PLC students from each section left the program with attitudes that were quite different from each other. On the post-survey, when compared to Section 1 students, Section 2 students attached more importance to attaining the following outcomes:

- understanding and applying math concepts
- applying scientific knowledge and skills
- locating, screening, and organizing information
- improving problem-solving abilities and reasoning skills
- becoming more self-reliant.

Additionally, when compared to Section 1 students, Section 2 students

- more strongly believed that taking courses that are connected or related in some way aids their learning
- more strongly believed that working with other students or friends from their classes aids their learning
- more strongly valued working on their own.

Why the Section 2 students would simultaneously believe more strongly than Section 1 students that working with other students or friends from their classes aids their learning and yet attach more importance to becoming more self-reliant and more strongly value working on their own is a contradiction that may never be understood. The answer to why Section 2 students attached more importance to understanding and applying math concepts; applying scientific knowledge and skills; locating, screening, and organizing information; and improving problem-solving abilities and reasoning skills, and why they more strongly believed that taking courses that are connected or related in some way aids their learning is likely to be found in an exploration of various aspects of each PLC section.

Informal conversations with those involved with populating and running the PLC and personal observations have indicated that the following issues may be worth investigating when trying to make sense of why the students from each section had such different experiences:

- number of “early joiners”/number of “late joiners”
- gender ratio in sections and in teams
- organization/stability of the PLC environment at the beginning of A-term
- style of PLC professors from each section
- continuity of PLC professors from A- to B-terms
- goodness of fit between students’ approaches to learning and PLC philosophy/goals
- degree to which students are “locked-in” to a project team
- extent to which a student felt as if he or she had a choice to enroll in PLC.

Efforts are currently underway to determine what other issues may have contributed to creating such different experiences for students in each of the PLC sections.

APPENDIX A
Pre-survey

First Year Student Survey
August 2002

STATEMENT OF CONFIDENTIALITY

- All information that you provide in this electronic survey will be used for educational research purposes and will be kept strictly confidential.
- Whether or not you complete the survey will in no way affect your standing at WPI.
- If you do complete the survey, your responses will in no way affect your standing at WPI.

INSTRUCTIONS

- Please complete the entire survey.
- For items asking you to choose a response, please select only one response for each item by using your mouse to click on the bubble of your choice.
- For items asking you to provide information, please use the keyboard to enter either numbers or letters.

DEMOGRAPHIC INFORMATION

Please enter the last 4 digits of EITHER your social security number OR your student ID number: ____ ____ ____ ____

Please indicate from where the 4 digits came:

social security number student ID number

(If your social security number and student ID number are the same, please click on “social security number.”)

Please enter the first 3 letters of your *first* name: ____ ____ ____

Do you know your campus box number?

yes no

If you answered “yes” to the above question, please enter your campus box number here: _____

What is your gender: male female

Indicate **HOW MUCH IMPORTANCE YOU ATTACH** to attaining each of these outcomes.

| | IMPORTANCE | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | VERY GREAT | GREAT | MODERATE | LITTLE | NO |
| 1. Understanding and applying math concepts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Using information from <i>more than one</i> scientific discipline (e.g., math, physics, chemistry, biology, computer science) simultaneously to solve a problem or question | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Applying scientific knowledge and skills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Learning to think and reason | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Locating, screening, and organizing information | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Drawing conclusions after weighing evidence, facts, and ideas | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Being an effective team member | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Valuing input of those whose backgrounds are different from my own | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Improving my problem solving abilities and reasoning skills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. Expressing my own views and opinions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. Clearly articulating my thoughts through writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. Clearly articulating my thoughts through speaking | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. Giving a good oral presentation in front of a group | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. Writing well | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. Creating professional-quality reports | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. Obtaining information about social activities at this institution | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. Making social connections with faculty at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. Making social connections with upperclass students at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. Making social connections with other first year students at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. Improving my study skills and habits | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | IMPORTANCE | | | | |
|---|-----------------------|-----------------------|--|-----------------------|-----------------------|
| | VERY GREAT | GREAT | MODERATE | LITTLE | NO |
| 21. Learning how to make decisions effectively | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 22. Becoming more self-reliant | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. Managing my time more effectively | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. Coping with academic difficulties (grades, etc.) I may encounter | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. Identifying my personal strengths, abilities, and limitations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 26. Developing my personal values | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 27. Developing and demonstrating confidence in myself | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 28. Developing my understanding of standards of ethical behavior | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 29. Valuing academic achievement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 30. Valuing intellectual growth | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <i>Indicate your views of courses OUTSIDE YOUR INTENDED MAJOR.</i> | | | | | |
| Courses outside my major will help me. . . | STRONGLY AGREE | AGREE | AGREEMENT NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
| 31. . . . do better in courses in my major. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 32. . . . become better at solving problems in my major. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 33. . . . become better at communicating my ideas in my major. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 34. . . . become better at working on teams with people from other majors. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <i>Please indicate your views on the following statements.</i> | | | | | |
| | STRONGLY AGREE | AGREE | AGREEMENT NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
| 35. My first year courses will not be relevant to each other. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 36. Usually a project is best accomplished by taking a team approach. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 37. To be a good engineer or scientist, it is important to understand concepts in <u>basic</u> mathematics and science. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 38. When I'm working as part of a group, I feel more confident in myself than I do when I work alone. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | AGREEMENT | | | | |
|---|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|
| | STRONGLY AGREE | AGREE | NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
| 39. I don't like having to negotiate with members of my team. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 40. I expect that most of what I will learn in an introductory math or science course will not be useful outside that class. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 41. I enjoy the social aspects of working on a team. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 42. Sometimes it's better to try to solve a problem by looking for ways in which it's related to other material that might not initially seem relevant. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 43. I find that when I work on a team, I'm more productive than when I work alone. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 44. When working on a team, I can learn a lot by seeing how others work. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 45. When working on teams, I usually get stuck with more than my fair share of the work. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 46. I can clearly articulate what my skills are. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 47. I can clearly articulate what my developmental needs are. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 48. My behaviors, choices, and judgments are based on my own personal values. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 49. I have a well-defined goal or set of goals on which I will base my work at WPI. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 50. I have a well-defined goal or set of goals on which I base my life in general. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | ACADEMIC MOTIVATION | | | | |
|--|--|-----------------------|-----------------------|-----------------------|-----------------------|
| | COMPLETELY | VERY MUCH | MODERATELY | A LITTLE | NOT AT ALL |
| 51. Please characterize the degree to which you will try to excel academically at WPI. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 52. Please characterize the degree to which you feel confident in your ability to succeed academically at WPI. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 53. Please characterize the degree to which you anticipate you will try to excel academically at WPI because you find the subjects and courses interesting. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 54. Please characterize the degree to which you anticipate you will try to excel academically at WPI because you feel such achievements will ultimately lead to better grades, jobs, and/or graduate school opportunities. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 55. Please characterize the degree to which you anticipate you will try to excel academically at WPI because you want to please your parents or because you enjoy praise and admiration from your instructors and/or peers. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 56. Of the given reasons for trying to excel academically at WPI, please identify which one motivates you the most: | | | | | |
| | <input type="radio"/> you find the subjects and courses interesting <input type="radio"/> you feel such achievements will ultimately lead to better grades, jobs, and/or graduate school opportunities <input type="radio"/> you want to please your parents or you enjoy praise and admiration from your instructors and/or peers | | | | |

Below is a list of statements dealing with your general feelings about yourself. For each statement, please select the response that best reflects your agreement with it.

| | STRONGLY AGREE | AGREE | NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
|--|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|
| 57. On the whole, I am satisfied with myself. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 58. At times I think I am no good at all. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 59. I feel that I have a number of good qualities. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 60. I am able to do things as well as most other people. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 61. I feel I do not have much to be proud of. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 62. I certainly feel useless at times. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 63. I feel that I'm a person of worth, at least on an equal plane with others. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 64. I wish I could have more respect for myself. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 65. All in all, I am inclined to feel that I am a failure. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 66. I take a positive attitude toward myself. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

You have finished the survey and have earned
5 POINTS
that will be credited to your Insight account.

Please do not discuss any aspect of the survey with any student who has not yet taken it.

Thank you for your time and input!

APPENDIX B
Post-survey

First-Year Student Survey January 2003

STATEMENT OF CONFIDENTIALITY

- All information that you provide in this electronic survey will be used for educational research purposes and will be kept strictly confidential.
- Whether or not you complete the survey will in no way affect your standing at WPI.
- If you do complete the survey, your responses will in no way affect your standing at WPI.

INSTRUCTIONS

- This survey should take no longer than 30 minutes to complete. If you do not have 30 minutes right now to take the survey, please wait and do it at another time.
- Please complete the entire survey.
- For items asking you to choose a response, please select only one response for each item by using your mouse to click on the bubble of your choice.
- For items asking you to provide information, please use the keyboard to enter either numbers or letters.
- You will be paid \$20 cash in exchange for completing this survey. The demographic information you provide below will help us to contact you with instructions on how to obtain your payment. If you do not complete the demographic information section, it may not be possible to issue payment to you.

DEMOGRAPHIC INFORMATION

Please enter the last 4 digits of EITHER your social security number OR your student ID number: ____ ____ ____ ____

Please indicate from where the 4 digits came:

social security number student ID number

(If your social security number and student ID number are the same, please click on “social security number.”)

Please enter the first 3 letters of your *first* name: ____ ____ ____

Please enter your campus box number here: _____

What is your gender? male female

What is your e-mail address? _____

Indicate **HOW MUCH IMPORTANCE YOU ATTACH** to attaining each of these outcomes.

| | IMPORTANCE | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | VERY GREAT | GREAT | MODERATE | LITTLE | NO |
| 1. Understanding and applying math concepts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Using information from <i>more than one</i> scientific discipline (e.g., math, physics, chemistry, biology, computer science) simultaneously to solve a problem or question | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Applying scientific knowledge and skills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Learning to think and reason | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Locating, screening, and organizing information | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Drawing conclusions after weighing evidence, facts, and ideas | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Being an effective team member | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Valuing input of those whose backgrounds are different from my own | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Improving my problem solving abilities and reasoning skills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. Expressing my own views and opinions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. Clearly articulating my thoughts through writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. Clearly articulating my thoughts through speaking | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. Giving a good oral presentation in front of a group | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. Writing well | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. Creating professional-quality reports | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. Obtaining information about social activities at this institution | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. Making social connections with faculty at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. Making social connections with upperclass students at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. Making social connections with other first year students at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. Improving my study skills and habits | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. Learning how to make decisions effectively | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | IMPORTANCE | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | VERY GREAT | GREAT | MODERATE | LITTLE | NO |
| 22. Becoming more self-reliant | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. Managing my time more effectively | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. Coping with academic difficulties (grades, etc.) I may encounter | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. Identifying my personal strengths, abilities, and limitations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 26. Developing my personal values | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 27. Developing and demonstrating confidence in myself | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 28. Developing my understanding of standards of ethical behavior | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 29. Valuing academic achievement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 30. Valuing intellectual growth | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Indicate HOW MUCH PROGRESS YOU THINK YOU HAVE MADE in each of the following areas during A- and B-terms of this academic year.

| | PROGRESS MADE DURING A- AND B-TERMS | | | | |
|---|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | VERY MUCH | MUCH | MODERATE | LITTLE | NONE |
| 31. Understanding and applying math concepts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 32. Using information from <i>more than one</i> scientific discipline (e.g., math, physics, chemistry, biology, computer science) simultaneously to solve a problem or question | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 33. Applying scientific knowledge and skills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 34. Learning to think and reason | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 35. Locating, screening, and organizing information | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 36. Drawing conclusions after weighing evidence, facts, and ideas | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 37. Being an effective team member | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 38. Valuing input of those whose backgrounds are different from my own | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 39. Improving my problem solving abilities and reasoning skills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 40. Expressing my own views and opinions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

PROGRESS MADE DURING A- AND B-TERMS

| | VERY MUCH | MUCH | MODERATE | LITTLE | NONE |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 41. Clearly articulating my thoughts through writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 42. Clearly articulating my thoughts through speaking | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 43. Giving a good oral presentation in front of a group | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 44. Writing well | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 45. Creating professional-quality reports | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 46. Obtaining information about social activities at this institution | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 47. Making social connections with faculty at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 48. Making social connections with upperclass students at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 49. Making social connections with other first year students at WPI | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 50. Improving my study skills and habits | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 51. Learning how to make decisions effectively | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 52. Becoming more self-reliant | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 53. Managing my time more effectively | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 54. Coping with academic difficulties (grades, etc.) I may encounter | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 55. Identifying my personal strengths, abilities, and limitations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 56. Developing my personal values | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 57. Developing and demonstrating confidence in myself | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 58. Developing my understanding of standards of ethical behavior | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 59. Valuing academic achievement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 60. Valuing intellectual growth | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Indicate your views of courses OUTSIDE YOUR INTENDED MAJOR.

Courses **outside my major** will help me. . .

61. . . . do better in courses in my major.

62. . . . become better at solving problems in my major.

63. . . . become better at communicating my ideas in my major.

64. . . . become better at working on teams with people from other majors.

| | STRONGLY AGREE | AGREE | AGREEMENT NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
|--|-----------------------|-----------------------|--|-----------------------|-----------------------|
| 61. . . . do better in courses in my major. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 62. . . . become better at solving problems in my major. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 63. . . . become better at communicating my ideas in my major. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 64. . . . become better at working on teams with people from other majors. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please indicate your views on the following statements.

65. My first year courses are not relevant to each other.

66. Usually a project is best accomplished by taking a team approach.

67. To be a good engineer or scientist, it is important to understand concepts in basic mathematics and science.

68. When I'm working as part of a group, I feel more confident in myself than I do when I work alone.

69. I don't like having to negotiate with members of my team.

70. I expect that most of what I will learn in an introductory math or science course will not be useful outside that class.

71. I enjoy the social aspects of working on a team.

72. Sometimes it's better to try to solve a problem by looking for ways in which it's related to other material that might not initially seem relevant.

73. I find that when I work on a team, I'm more productive than when I work alone.

74. When working on a team, I can learn a lot by seeing how others work.

75. When working on teams, I usually get stuck with more than my fair share of the work.

76. I am good at giving oral presentations.

77. I am confident when I give an oral presentation in front of an audience.

| | STRONGLY AGREE | AGREE | AGREEMENT NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
|---|-----------------------|-----------------------|--|-----------------------|-----------------------|
| 65. My first year courses are not relevant to each other. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 66. Usually a project is best accomplished by taking a team approach. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 67. To be a good engineer or scientist, it is important to understand concepts in <u>basic</u> mathematics and science. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 68. When I'm working as part of a group, I feel more confident in myself than I do when I work alone. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 69. I don't like having to negotiate with members of my team. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 70. I expect that most of what I will learn in an introductory math or science course will not be useful outside that class. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 71. I enjoy the social aspects of working on a team. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 72. Sometimes it's better to try to solve a problem by looking for ways in which it's related to other material that might not initially seem relevant. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 73. I find that when I work on a team, I'm more productive than when I work alone. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 74. When working on a team, I can learn a lot by seeing how others work. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 75. When working on teams, I usually get stuck with more than my fair share of the work. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 76. I am good at giving oral presentations. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 77. I am confident when I give an oral presentation in front of an audience. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | AGREEMENT | | | | |
|---|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|
| | STRONGLY AGREE | AGREE | NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
| 78. I can write about an article I have read so that someone reading what I've written can understand the article's main point. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 79. I would recommend WPI to a friend. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 80. WPI's faculty members truly care about the students and teaching. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 81. I can clearly articulate what my skills are. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 82. I can clearly articulate what my developmental needs are. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 83. My behaviors, choices, and judgments are based on my own personal values. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 84. I have a well-defined goal or set of goals on which I base my work at WPI. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 85. I have a well-defined goal or set of goals on which I base my life in general. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | ACADEMIC MOTIVATION | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | COMPLETELY | VERY MUCH | MODERATELY | A LITTLE | NOT AT ALL |
| 86. Please characterize the degree to which you try to excel academically at WPI. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 87. Please characterize the degree to which you feel confident in your ability to succeed academically at WPI. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 88. Please characterize the degree to which you try to excel academically at WPI because you find the subjects and courses interesting. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 89. Please characterize the degree to which you try to excel academically at WPI because you feel such achievements will ultimately lead to better grades, jobs, and/or graduate school opportunities. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 90. Please characterize the degree to which you try to excel academically at WPI because you want to please your parents or because you enjoy praise and admiration from your instructors and/or peers. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

91. Of the given reasons for trying to excel academically at WPI, please identify which one motivates you the most:

- you find the subjects and courses interesting
- you feel such achievements will ultimately lead to better grades, jobs, and/or graduate school opportunities
- you want to please your parents or you enjoy praise and admiration from your instructors and/or peers

Below is a list of statements dealing with your general feelings about yourself. For each statement, please select the response that best reflects your agreement with it.

| | STRONGLY AGREE | AGREE | NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
|--|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|
| 92. On the whole, I am satisfied with myself. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 93. At times I think I am no good at all. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 94. I feel that I have a number of good qualities. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 95. I am able to do things as well as most other people. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 96. I feel I do not have much to be proud of. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 97. I certainly feel useless at times. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 98. I feel that I'm a person of worth, at least on an equal plane with others. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 99. I wish I could have more respect for myself. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 100. All in all, I am inclined to feel that I am a failure. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 101. I take a positive attitude toward myself. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please click on the bubble that corresponds to the extent to which you encountered each type of learning situation during terms A and B of your first year at WPI. Consider a course to be worth 1/3 of a unit.

| | EXTENT TO WHICH YOU <u>ENCOUNTERED</u> THIS | | | | |
|--|---|-----------------------|-----------------------|-----------------------|-----------------------|
| | TYPE OF LEARNING SITUATION | | | | |
| | <u>IN A- AND B-TERMS</u> | | | | |
| | 7 OR MORE COURSES | 5 OR 6 COURSES | 3 OR 4 COURSES | 1 OR 2 COURSES | NOT AT ALL |
| 102. Large lecture classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 103. Small lecture classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 104. Small discussion classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 105. Project work in classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 106. Group work in classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 107. Teaching Assistants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 108. Peer Learning Assistants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 109. Tutoring by MASH leaders | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 110. Individual consultation with faculty | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 111. Working on my own | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 112. Taking courses that are connected or related in some way | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 113. Taking multiple courses with the same group of students | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 114. Working with other students or friends from my classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 115. Working in an atmosphere that allows me flexibility to approach learning in ways that suit me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please click on the bubble that corresponds to the extent you believe each type of learning situation aids your learning.

| | EXTENT TO WHICH THIS TYPE OF SITUATION <u>AIDS YOUR LEARNING</u> | | | | |
|--|---|-----------------------|-----------------------|-----------------------|-----------------------|
| | VERY MUCH | MUCH | MODERATELY | LITTLE | NOT AT ALL |
| 116. Large lecture classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 117. Small lecture classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 118. Small discussion classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 119. Project work in classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 120. Group work in classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 121. Teaching Assistants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 122. Peer Learning Assistants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 123. Tutoring by MASH leaders | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 124. Individual consultation with faculty | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 125. Working on my own | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 126. Taking courses that are connected or related in some way | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 127. Taking multiple courses with the same group of students | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 128. Working with other students or friends from my classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 129. Working in an atmosphere that allows me flexibility to approach learning in ways that suit me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please click on the bubble that corresponds to the extent to which you value each type of learning situation.

| | EXTENT TO WHICH YOU <u>VALUE</u> THIS TYPE OF LEARNING SITUATION | | | | |
|--|---|-----------------------|-----------------------|-----------------------|-----------------------|
| | VERY MUCH | MUCH | MODERATELY | LITTLE | NOT AT ALL |
| 130. Large lecture classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 131. Small lecture classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 132. Small discussion classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 133. Project work in classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 134. Group work in classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 135. Teaching Assistants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 136. Peer Learning Assistants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 137. Tutoring by MASH leaders | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 138. Individual consultation with faculty | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 139. Working on my own | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 140. Taking courses that are connected or related in some way | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 141. Taking multiple courses with the same group of students | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 142. Working with other students or friends from my classes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 143. Working in an atmosphere that allows me flexibility to approach learning in ways that suit me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

You have finished the survey.

**Shortly, you will receive information via e-mail on how to obtain your
\$20 honorarium.**

Please do not discuss any aspect of the survey with any student who has not yet taken it.

Thank you for your time and input!

APPENDIX C

PLC Recruitment Advertisement for 2002 - 2003 First-year Students

Project-Based Learning Community Option

WPI is offering a program that blends Physics, Math, and Humanities together in a unified learning experience constructed around group projects and intensively utilizing educational technology. If you are planning to take the first two math and physics courses ([MA 1021](#), [1022](#), [PH 1110](#), [1120](#)) and a humanities course in history of science or technology, history, literature, or philosophy during A and B terms, you would be eligible for the Project-Based Learning Community option (PLC). The details of the experience are spelled out on the [PLC Web site](#).

This option is a new way to master fundamental knowledge and at the same time begin intensively the group project approach distinctive to WPI's degree requirements. The PLC interactively explores the relationships among physics, math, and humanities while experimenting with alternative learning methods and processes that are entirely outcomes-based. If you are a risk-taking, self-initiating student impatient with static classroom learning, the PLC option is a very lively alternative. Enrollment is limited, so if you are interested in receiving more information, please check the box marked Project-Based Learning Community Option on the [Course Selections Page](#). Please note that you will not be able to select this option through the Web Registration System.

(Text also available at the following web address:
<http://www.wpi.edu/Admin/OAA/Blueprint/option.html>)

APPENDIX D

Results of all statistical analyses for 02-03 PLC and Control groups

Because item numbers were not used in the text of the report, it will be necessary to identify the number of an item of interest by scanning either Appendix A (pre-survey) or Appendix B (post-survey) before using these tables. Item numbers from the surveys correspond to item numbers in the tables. In the tables, items that are from the pre-survey are preceded by the prefix “PRE” and items that are from the post-survey are preceded by the prefix “POST.”

MANN-WHITNEY *U* TEST RESULTS

PLC vs. Control -- pre-survey

| <u>Item</u> | <u>Rank Sum</u> <u>Control</u> | <u>Rank Sum</u> <u>PLC</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Control</u> | <u>Valid n</u> <u>PLC</u> |
|-------------|-----------------------------------|-------------------------------|----------|-----------------------------|----------------|----------------------------------|------------------------------|
| PRE1 | 240.5000 | 255.5000 | 102.5000 | .730240 | .465249 | 14 | 17 |
| PRE2 | 259.5000 | 236.5000 | 83.5000 | 1.504188 | .132543 | 14 | 17 |
| PRE3 | 252.5000 | 243.5000 | 90.5000 | 1.251945 | .210599 | 14 | 17 |
| PRE4 | 227.5000 | 268.5000 | 115.5000 | .157547 | .874814 | 14 | 17 |
| PRE5 | 228.5000 | 267.5000 | 114.5000 | .198560 | .842608 | 14 | 17 |
| PRE6 | 254.5000 | 241.5000 | 88.5000 | 1.365323 | .172161 | 14 | 17 |
| PRE7 | 283.0000 | 213.0000 | 60.0000 | 2.499343 | .012447 | 14 | 17 |
| PRE8 | 271.5000 | 224.5000 | 71.5000 | 2.034496 | .041910 | 14 | 17 |
| PRE9 | 258.0000 | 238.0000 | 85.0000 | 1.518112 | .128996 | 14 | 17 |
| PRE10 | 249.0000 | 247.0000 | 94.0000 | 1.070787 | .284273 | 14 | 17 |
| PRE11 | 266.5000 | 229.5000 | 76.5000 | 1.812063 | .069986 | 14 | 17 |
| PRE12 | 259.5000 | 236.5000 | 83.5000 | 1.479087 | .139127 | 14 | 17 |
| PRE13 | 273.0000 | 223.0000 | 70.0000 | 2.045650 | .040799 | 14 | 17 |
| PRE14 | 253.5000 | 242.5000 | 89.5000 | 1.271161 | .203681 | 14 | 17 |
| PRE15 | 247.5000 | 248.5000 | 95.5000 | 1.003365 | .315692 | 14 | 17 |
| PRE16 | 239.5000 | 256.5000 | 103.5000 | .653389 | .513510 | 14 | 17 |
| PRE17 | 278.5000 | 217.5000 | 64.5000 | 2.357959 | .018382 | 14 | 17 |
| PRE18 | 254.5000 | 241.5000 | 88.5000 | 1.353403 | .175936 | 14 | 17 |
| PRE19 | 242.0000 | 254.0000 | 101.0000 | .810244 | .417806 | 14 | 17 |
| PRE20 | 255.0000 | 241.0000 | 88.0000 | 1.335320 | .181781 | 14 | 17 |
| PRE22 | 253.5000 | 242.5000 | 89.5000 | 1.247525 | .212214 | 14 | 17 |
| PRE23 | 251.5000 | 244.5000 | 91.5000 | 1.255409 | .209340 | 14 | 17 |
| PRE24 | 257.0000 | 239.0000 | 86.0000 | 1.435338 | .151200 | 14 | 17 |
| PRE25 | 286.0000 | 210.0000 | 57.0000 | 2.722522 | .006482 | 14 | 17 |
| PRE26 | 258.5000 | 237.5000 | 84.5000 | 1.517387 | .129179 | 14 | 17 |
| PRE27 | 259.5000 | 236.5000 | 83.5000 | 1.520696 | .128346 | 14 | 17 |
| PRE28 | 284.5000 | 211.5000 | 58.5000 | 2.606957 | .009139 | 14 | 17 |
| PRE29 | 239.0000 | 257.0000 | 104.0000 | .634335 | .525867 | 14 | 17 |
| PRE30 | 251.0000 | 245.0000 | 92.0000 | 1.150925 | .249772 | 14 | 17 |
| PRE31 | 267.5000 | 228.5000 | 75.5000 | 2.052600 | .040120 | 14 | 17 |
| PRE32 | 241.0000 | 255.0000 | 102.0000 | .781720 | .434385 | 14 | 17 |
| PRE33 | 278.5000 | 217.5000 | 64.5000 | 2.377980 | .017414 | 14 | 17 |
| PRE34 | 287.0000 | 209.0000 | 56.0000 | 2.740190 | .006144 | 14 | 17 |
| PRE35 | 182.0000 | 314.0000 | 77.0000 | -1.788870 | .073645 | 14 | 17 |
| PRE36 | 247.0000 | 249.0000 | 96.0000 | .959560 | .337283 | 14 | 17 |
| PRE37 | 221.0000 | 275.0000 | 116.0000 | -.150510 | .880365 | 14 | 17 |
| PRE38 | 233.5000 | 262.5000 | 109.5000 | .401700 | .687908 | 14 | 17 |
| PRE39 | 210.0000 | 286.0000 | 105.0000 | -.619360 | .535681 | 14 | 17 |
| PRE40 | 202.0000 | 294.0000 | 97.0000 | -.913180 | .361157 | 14 | 17 |
| PRE41 | 257.0000 | 239.0000 | 86.0000 | 1.641370 | .100730 | 14 | 17 |
| PRE42 | 272.0000 | 193.0000 | 40.0000 | 3.145930 | .001657 | 13 | 17 |
| PRE43 | 266.0000 | 230.0000 | 77.0000 | 1.773700 | .076122 | 14 | 17 |
| PRE44 | 243.0000 | 253.0000 | 100.0000 | .888970 | .374025 | 14 | 17 |
| PRE45 | 240.5000 | 255.5000 | 102.5000 | .716110 | .473928 | 14 | 17 |
| PRE46 | 226.0000 | 270.0000 | 117.0000 | .085670 | .931727 | 14 | 17 |

MANN-WHITNEY U TEST RESULTS (continued)***PLC vs. Control -- pre-survey (continued)***

| <u>Item</u> | <u>Rank Sum</u> <u>Control</u> | <u>Rank Sum</u> <u>PLC</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Control</u> | <u>Valid n</u> <u>PLC</u> |
|-------------|-----------------------------------|-------------------------------|----------|-----------------------------|----------------|----------------------------------|------------------------------|
| PRE47 | 213.0000 | 252.0000 | 99.0000 | .508240 | .611288 | 13 | 17 |
| PRE48 | 248.5000 | 247.5000 | 94.5000 | 1.079570 | .280342 | 14 | 17 |
| PRE49 | 234.5000 | 261.5000 | 108.5000 | .440520 | .659563 | 14 | 17 |
| PRE50 | 246.0000 | 250.0000 | 97.0000 | .966180 | .333964 | 14 | 17 |
| PRE51 | 207.0000 | 289.0000 | 102.0000 | -.807356 | .419467 | 14 | 17 |
| PRE52 | 208.0000 | 288.0000 | 103.0000 | -.716511 | .473681 | 14 | 17 |
| PRE53 | 242.0000 | 254.0000 | 101.0000 | .790702 | .429124 | 14 | 17 |
| PRE54 | 232.5000 | 263.5000 | 110.5000 | .376043 | .706888 | 14 | 17 |
| PRE55 | 228.0000 | 268.0000 | 115.0000 | .167066 | .867319 | 14 | 17 |

PLC vs. Control – post-survey

| <u>Item</u> | <u>Rank Sum</u> <u>Control</u> | <u>Rank Sum</u> <u>PLC</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Control</u> | <u>Valid n</u> <u>PLC</u> |
|-------------|-----------------------------------|-------------------------------|----------|-----------------------------|----------------|----------------------------------|------------------------------|
| POST1 | 265.5000 | 230.5000 | 77.5000 | 1.805047 | .071077 | 14 | 17 |
| POST2 | 231.0000 | 234.0000 | 81.0000 | 1.314887 | .188557 | 13 | 17 |
| POST3 | 256.5000 | 239.5000 | 86.5000 | 1.401931 | .160945 | 14 | 17 |
| POST4 | 251.0000 | 245.0000 | 92.0000 | 1.354568 | .175565 | 14 | 17 |
| POST5 | 242.0000 | 254.0000 | 101.0000 | .758775 | .447993 | 14 | 17 |
| POST6 | 251.5000 | 244.5000 | 91.5000 | 1.162947 | .244860 | 14 | 17 |
| POST7 | 214.0000 | 282.0000 | 109.0000 | -.415263 | .677952 | 14 | 17 |
| POST8 | 275.5000 | 220.5000 | 67.5000 | 2.164306 | .030448 | 14 | 17 |
| POST9 | 284.0000 | 212.0000 | 59.0000 | 2.641551 | .008257 | 14 | 17 |
| POST10 | 261.5000 | 234.5000 | 81.5000 | 1.623421 | .104509 | 14 | 17 |
| POST11 | 241.0000 | 255.0000 | 102.0000 | .764834 | .444376 | 14 | 17 |
| POST12 | 255.0000 | 241.0000 | 88.0000 | 1.308118 | .190843 | 14 | 17 |
| POST13 | 281.0000 | 215.0000 | 62.0000 | 2.397613 | .016508 | 14 | 17 |
| POST14 | 256.5000 | 239.5000 | 86.5000 | 1.358932 | .174178 | 14 | 17 |
| POST15 | 245.5000 | 250.5000 | 97.5000 | .966539 | .333782 | 14 | 17 |
| POST16 | 222.5000 | 242.5000 | 106.5000 | .24060 | .809863 | 14 | 16 |
| POST17 | 270.5000 | 225.5000 | 72.5000 | 1.96218 | .049751 | 14 | 17 |
| POST18 | 243.0000 | 253.0000 | 100.0000 | .81332 | .416040 | 14 | 17 |
| POST19 | 239.0000 | 257.0000 | 104.0000 | .64022 | .522033 | 14 | 17 |
| POST20 | 245.5000 | 250.5000 | 97.5000 | .91225 | .361647 | 14 | 17 |
| POST21 | 232.5000 | 263.5000 | 110.5000 | .36216 | .717235 | 14 | 17 |
| POST22 | 218.5000 | 277.5000 | 113.5000 | -.23599 | .813443 | 14 | 17 |
| POST23 | 214.5000 | 281.5000 | 109.5000 | -.40060 | .688716 | 14 | 17 |
| POST24 | 220.0000 | 276.0000 | 115.0000 | -.17230 | .863203 | 14 | 17 |
| POST25 | 205.0000 | 291.0000 | 100.0000 | -.79749 | .425172 | 14 | 17 |
| POST26 | 231.5000 | 264.5000 | 111.5000 | .32127 | .748005 | 14 | 17 |
| POST27 | 225.5000 | 270.5000 | 117.5000 | .06553 | .947753 | 14 | 17 |
| POST28 | 220.5000 | 275.5000 | 115.5000 | -.14636 | .883636 | 14 | 17 |
| POST29 | 196.0000 | 300.0000 | 91.0000 | -1.17605 | .239585 | 14 | 17 |
| POST30 | 211.0000 | 285.0000 | 106.0000 | -.55997 | .575502 | 14 | 17 |
| POST31 | 301.5000 | 194.5000 | 41.5000 | 3.277396 | .001049 | 14 | 17 |
| POST32 | 259.5000 | 236.5000 | 83.5000 | 1.513077 | .130270 | 14 | 17 |
| POST33 | 236.5000 | 259.5000 | 106.5000 | .540363 | .588950 | 14 | 17 |
| POST34 | 277.0000 | 219.0000 | 66.0000 | 2.425342 | .015299 | 14 | 17 |
| POST35 | 268.5000 | 227.5000 | 74.5000 | 1.916149 | .055355 | 14 | 17 |
| POST36 | 252.0000 | 244.0000 | 91.0000 | 1.247825 | .212104 | 14 | 17 |
| POST37 | 325.0000 | 171.0000 | 18.0000 | 4.135264 | .000036 | 14 | 17 |
| POST38 | 280.5000 | 215.5000 | 62.5000 | 2.304656 | .021192 | 14 | 17 |
| POST39 | 289.0000 | 207.0000 | 54.0000 | 2.717863 | .006574 | 14 | 17 |
| POST40 | 258.5000 | 237.5000 | 84.5000 | 1.424352 | .154354 | 14 | 17 |
| POST41 | 258.5000 | 237.5000 | 84.5000 | 1.432657 | .151966 | 14 | 17 |
| POST42 | 305.5000 | 190.5000 | 37.5000 | 3.371768 | .000748 | 14 | 17 |
| POST43 | 328.0000 | 168.0000 | 15.0000 | 4.265419 | .000020 | 14 | 17 |
| POST44 | 267.0000 | 229.0000 | 76.0000 | 1.775280 | .075861 | 14 | 17 |
| POST45 | 318.5000 | 177.5000 | 24.5000 | 3.978144 | .000070 | 14 | 17 |
| POST46 | 219.5000 | 276.5000 | 114.5000 | -.186601 | .851975 | 14 | 17 |
| POST47 | 308.0000 | 188.0000 | 35.0000 | 3.493995 | .000476 | 14 | 17 |
| POST48 | 258.0000 | 238.0000 | 85.0000 | 1.395215 | .162961 | 14 | 17 |
| POST49 | 241.0000 | 255.0000 | 102.0000 | .719407 | .471896 | 14 | 17 |

MANN-WHITNEY *U* TEST RESULTS (continued)
PLC vs. Control – post-survey (continued)

| <u>Item</u> | <u>Rank Sum</u> <u>Control</u> | <u>Rank Sum</u> <u>PLC</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Control</u> | <u>Valid n</u> <u>PLC</u> |
|-------------|-----------------------------------|-------------------------------|----------|-----------------------------|----------------|----------------------------------|------------------------------|
| POST50 | 229.5000 | 266.5000 | 113.5000 | .229973 | .818114 | 14 | 17 |
| POST51 | 243.5000 | 252.5000 | 99.5000 | .833260 | .404704 | 14 | 17 |
| POST52 | 217.0000 | 279.0000 | 112.0000 | -.294177 | .768624 | 14 | 17 |
| POST53 | 213.5000 | 282.5000 | 108.5000 | -.459882 | .645604 | 14 | 17 |
| POST54 | 226.5000 | 269.5000 | 116.5000 | .108817 | .913348 | 14 | 17 |
| POST55 | 206.5000 | 289.5000 | 101.5000 | -.752738 | .451613 | 14 | 17 |
| POST56 | 240.0000 | 256.0000 | 103.0000 | .664201 | .506567 | 14 | 17 |
| POST57 | 249.5000 | 246.5000 | 93.5000 | 1.061617 | .288417 | 14 | 17 |
| POST58 | 236.5000 | 259.5000 | 106.5000 | .532032 | .594707 | 14 | 17 |
| POST59 | 224.5000 | 271.5000 | 118.5000 | .020781 | .983420 | 14 | 17 |
| POST60 | 222.5000 | 273.5000 | 117.5000 | -.062847 | .949889 | 14 | 17 |
| POST61 | 297.0000 | 199.0000 | 46.0000 | 3.14335 | .001672 | 14 | 17 |
| POST62 | 291.0000 | 205.0000 | 52.0000 | 2.98321 | .002855 | 14 | 17 |
| POST63 | 263.0000 | 233.0000 | 80.0000 | 1.66516 | .095891 | 14 | 17 |
| POST64 | 258.0000 | 238.0000 | 85.0000 | 1.48261 | .138189 | 14 | 17 |
| POST65 | 176.0000 | 320.0000 | 71.0000 | -2.09872 | .035850 | 14 | 17 |
| POST66 | 275.0000 | 221.0000 | 68.0000 | 2.17930 | .029317 | 14 | 17 |
| POST67 | 226.5000 | 269.5000 | 116.5000 | .11382 | .909377 | 14 | 17 |
| POST68 | 260.0000 | 236.0000 | 83.0000 | 1.53564 | .124637 | 14 | 17 |
| POST69 | 216.5000 | 279.5000 | 111.5000 | -.31134 | .755541 | 14 | 17 |
| POST70 | 187.0000 | 309.0000 | 82.0000 | -1.52276 | .127829 | 14 | 17 |
| POST71 | 258.5000 | 237.5000 | 84.5000 | 1.71327 | .086672 | 14 | 17 |
| POST72 | 267.5000 | 228.5000 | 75.5000 | 1.99061 | .046532 | 14 | 17 |
| POST73 | 263.5000 | 232.5000 | 79.5000 | 1.62565 | .104035 | 14 | 17 |
| POST74 | 210.0000 | 286.0000 | 105.0000 | -.80701 | .419668 | 14 | 17 |
| POST75 | 223.0000 | 273.0000 | 118.0000 | -.04131 | .967051 | 14 | 17 |
| POST76 | 273.5000 | 222.5000 | 69.5000 | 2.03544 | .041815 | 14 | 17 |
| POST77 | 277.5000 | 218.5000 | 65.5000 | 2.17788 | .029422 | 14 | 17 |
| POST78 | 217.0000 | 279.0000 | 112.0000 | -.31132 | .755556 | 14 | 17 |
| POST79 | 224.0000 | 272.0000 | 119.0000 | 0.00000 | 1.000000 | 14 | 17 |
| POST80 | 242.5000 | 253.5000 | 100.5000 | .82815 | .407593 | 14 | 17 |
| POST81 | 238.0000 | 258.0000 | 105.0000 | .61636 | .537660 | 14 | 17 |
| POST82 | 226.0000 | 270.0000 | 117.0000 | .08721 | .930503 | 14 | 17 |
| POST83 | 227.0000 | 269.0000 | 116.0000 | .13560 | .892135 | 14 | 17 |
| POST84 | 215.5000 | 280.5000 | 110.5000 | -.35387 | .723437 | 14 | 17 |
| POST85 | 239.0000 | 257.0000 | 104.0000 | .64635 | .518055 | 14 | 17 |
| POST86 | 223.5000 | 272.5000 | 118.5000 | -.02261 | .981962 | 14 | 17 |
| POST87 | 240.5000 | 255.5000 | 102.5000 | .69737 | .485577 | 14 | 17 |
| POST88 | 239.5000 | 256.5000 | 103.5000 | .65250 | .514083 | 14 | 17 |
| POST89 | 245.0000 | 251.0000 | 98.0000 | .97844 | .327862 | 14 | 17 |
| POST90 | 194.0000 | 302.0000 | 89.0000 | -1.23200 | .217958 | 14 | 17 |
| POST102 | 236.5000 | 259.5000 | 106.5000 | .64879 | .516479 | 14 | 17 |
| POST103 | 200.0000 | 296.0000 | 95.0000 | -1.00770 | .313607 | 14 | 17 |
| POST104 | 292.0000 | 204.0000 | 51.0000 | 2.97318 | .002949 | 14 | 17 |
| POST105 | 327.0000 | 169.0000 | 16.0000 | 4.22532 | .000024 | 14 | 17 |
| POST106 | 328.5000 | 167.5000 | 14.5000 | 4.33090 | .000015 | 14 | 17 |
| POST107 | 247.5000 | 248.5000 | 95.5000 | .97770 | .328229 | 14 | 17 |
| POST108 | 308.5000 | 187.5000 | 34.5000 | 3.51908 | .000434 | 14 | 17 |
| POST109 | 221.5000 | 274.5000 | 116.5000 | -.10497 | .916401 | 14 | 17 |
| POST110 | 283.5000 | 212.5000 | 59.5000 | 2.53777 | .011161 | 14 | 17 |
| POST111 | 177.5000 | 318.5000 | 72.5000 | -1.95286 | .050845 | 14 | 17 |
| POST112 | 225.0000 | 271.0000 | 118.0000 | .04216 | .966368 | 14 | 17 |
| POST113 | 304.5000 | 191.5000 | 38.5000 | 3.43586 | .000591 | 14 | 17 |
| POST114 | 294.0000 | 202.0000 | 49.0000 | 3.00953 | .002619 | 14 | 17 |
| POST115 | 253.5000 | 242.5000 | 89.5000 | 1.22733 | .219708 | 14 | 17 |
| POST116 | 204.0000 | 292.0000 | 99.0000 | -.82779 | .407795 | 14 | 17 |
| POST117 | 218.0000 | 278.0000 | 113.0000 | -.25609 | .797884 | 14 | 17 |
| POST118 | 259.0000 | 237.0000 | 84.0000 | 1.49490 | .134951 | 14 | 17 |
| POST119 | 297.5000 | 198.5000 | 45.5000 | 3.11145 | .001863 | 14 | 17 |
| POST120 | 302.0000 | 194.0000 | 41.0000 | 3.28578 | .001018 | 14 | 17 |
| POST121 | 268.0000 | 197.0000 | 61.0000 | 2.20806 | .027247 | 14 | 16 |
| POST122 | 306.5000 | 189.5000 | 36.5000 | 3.41913 | .000629 | 14 | 17 |
| POST123 | 218.5000 | 246.5000 | 110.5000 | .06487 | .948276 | 14 | 16 |
| POST124 | 269.5000 | 226.5000 | 73.5000 | 1.96060 | .049934 | 14 | 17 |

MANN-WHITNEY U TEST RESULTS (continued)**PLC vs. Control – post-survey (continued)**

| <u>Item</u> | <u>Rank Sum</u> <u>Control</u> | <u>Rank Sum</u> <u>PLC</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Control</u> | <u>Valid n</u> <u>PLC</u> |
|-------------|-----------------------------------|-------------------------------|----------|-----------------------------|----------------|----------------------------------|------------------------------|
| POST125 | 191.0000 | 305.0000 | 86.0000 | -1.37386 | .169495 | 14 | 17 |
| POST126 | 248.0000 | 248.0000 | 95.0000 | 1.02079 | .307361 | 14 | 17 |
| POST127 | 268.0000 | 228.0000 | 75.0000 | 1.85753 | .063245 | 14 | 17 |
| POST128 | 223.0000 | 273.0000 | 118.0000 | -.04222 | .966326 | 14 | 17 |
| POST129 | 257.0000 | 239.0000 | 86.0000 | 1.38247 | .166837 | 14 | 17 |
| POST130 | 223.5000 | 272.5000 | 118.5000 | -.02114 | .983132 | 14 | 17 |
| POST131 | 248.5000 | 247.5000 | 94.5000 | 1.03278 | .301716 | 14 | 17 |
| POST132 | 281.5000 | 214.5000 | 61.5000 | 2.44310 | .014567 | 14 | 17 |
| POST133 | 291.5000 | 204.5000 | 51.5000 | 2.82334 | .004755 | 14 | 17 |
| POST134 | 294.0000 | 202.0000 | 49.0000 | 2.87374 | .004059 | 14 | 17 |
| POST135 | 262.5000 | 202.5000 | 66.5000 | 1.96308 | .049646 | 14 | 16 |
| POST136 | 301.0000 | 195.0000 | 42.0000 | 3.23815 | .001204 | 14 | 17 |
| POST137 | 216.5000 | 248.5000 | 111.5000 | -.02150 | .982845 | 14 | 16 |
| POST138 | 264.5000 | 231.5000 | 78.5000 | 1.76605 | .077398 | 14 | 17 |
| POST139 | 198.5000 | 297.5000 | 93.5000 | -1.10792 | .267905 | 14 | 17 |
| POST140 | 255.5000 | 240.5000 | 87.5000 | 1.33210 | .182836 | 14 | 17 |
| POST141 | 265.0000 | 231.0000 | 78.0000 | 1.70976 | .087320 | 14 | 17 |
| POST142 | 254.5000 | 241.5000 | 88.5000 | 1.29471 | .195429 | 14 | 17 |
| POST143 | 260.5000 | 235.5000 | 82.5000 | 1.52875 | .126336 | 14 | 17 |

PLC Section 1 vs. PLC Section 2 – pre-survey

| <u>Item</u> | <u>Rank Sum</u> <u>Section 1</u> | <u>Rank Sum</u> <u>Section 2</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Section 1</u> | <u>Valid n</u> <u>Section 2</u> |
|-------------|-------------------------------------|-------------------------------------|----------|-----------------------------|----------------|------------------------------------|------------------------------------|
| PRE1 | 87.0000 | 66.00000 | 30.00000 | .634794 | .525568 | 9 | 8 |
| PRE2 | 94.5000 | 58.50000 | 22.50000 | 1.428286 | .153219 | 9 | 8 |
| PRE3 | 94.5000 | 58.50000 | 22.50000 | 1.428286 | .153219 | 9 | 8 |
| PRE4 | 94.0000 | 59.00000 | 23.00000 | 1.423660 | .154555 | 9 | 8 |
| PRE5 | 90.0000 | 63.00000 | 27.00000 | .939743 | .347356 | 9 | 8 |
| PRE6 | 91.5000 | 61.50000 | 25.50000 | 1.096367 | .272927 | 9 | 8 |
| PRE7 | 95.0000 | 58.00000 | 22.00000 | 1.524725 | .127338 | 9 | 8 |
| PRE8 | 95.0000 | 58.00000 | 22.00000 | 1.454495 | .145819 | 9 | 8 |
| PRE9 | 93.0000 | 60.00000 | 24.00000 | 1.295767 | .195065 | 9 | 8 |
| PRE10 | 87.0000 | 66.00000 | 30.00000 | .616782 | .537383 | 9 | 8 |
| PRE11 | 102.5000 | 50.50000 | 14.50000 | 2.244941 | .024779 | 9 | 8 |
| PRE12 | 103.5000 | 49.50000 | 13.50000 | 2.334249 | .019589 | 9 | 8 |
| PRE13 | 103.0000 | 50.00000 | 14.00000 | 2.238177 | .025216 | 9 | 8 |
| PRE14 | 97.5000 | 55.50000 | 19.50000 | 1.806953 | .070779 | 9 | 8 |
| PRE15 | 97.5000 | 55.50000 | 19.50000 | 1.792781 | .073017 | 9 | 8 |
| PRE16 | 75.0000 | 78.00000 | 30.00000 | -.614636 | .538799 | 9 | 8 |
| PRE17 | 78.5000 | 74.50000 | 33.50000 | -.264497 | .791398 | 9 | 8 |
| PRE18 | 73.5000 | 79.50000 | 28.50000 | -.778083 | .436526 | 9 | 8 |
| PRE19 | 97.5000 | 55.50000 | 19.50000 | 1.875164 | .060779 | 9 | 8 |
| PRE20 | 98.0000 | 55.00000 | 19.00000 | 1.818906 | .068935 | 9 | 8 |
| PRE21 | 93.0000 | 60.00000 | 24.00000 | 1.295767 | .195065 | 9 | 8 |
| PRE22 | 96.0000 | 57.00000 | 21.00000 | 1.566238 | .117303 | 9 | 8 |
| PRE23 | 93.5000 | 59.50000 | 23.50000 | 1.499559 | .133739 | 9 | 8 |
| PRE24 | 109.0000 | 44.00000 | 8.00000 | 3.066344 | .002169 | 9 | 8 |
| PRE25 | 102.5000 | 50.50000 | 14.50000 | 2.300380 | .021433 | 9 | 8 |
| PRE26 | 94.0000 | 59.00000 | 23.00000 | 1.347718 | .177759 | 9 | 8 |
| PRE27 | 96.0000 | 57.00000 | 21.00000 | 1.549558 | .121258 | 9 | 8 |
| PRE28 | 96.5000 | 56.50000 | 20.50000 | 1.608038 | .107837 | 9 | 8 |
| PRE29 | 101.5000 | 51.50000 | 15.50000 | 2.107337 | .035096 | 9 | 8 |
| PRE30 | 95.0000 | 58.00000 | 22.00000 | 1.484488 | .137689 | 9 | 8 |
| PRE31 | 88.0000 | 65.00000 | 29.00000 | .909059 | .363326 | 9 | 8 |
| PRE32 | 87.0000 | 66.00000 | 30.00000 | .681878 | .495321 | 9 | 8 |
| PRE33 | 98.0000 | 55.00000 | 19.00000 | 1.818906 | .068935 | 9 | 8 |
| PRE34 | 97.0000 | 56.00000 | 20.00000 | 1.832491 | .066888 | 9 | 8 |
| PRE35 | 83.0000 | 70.00000 | 34.00000 | .204453 | .838001 | 9 | 8 |
| PRE36 | 99.5000 | 53.50000 | 17.50000 | 1.882103 | .059831 | 9 | 8 |
| PRE37 | 93.0000 | 60.00000 | 24.00000 | 1.446481 | .148052 | 9 | 8 |
| PRE38 | 92.5000 | 60.50000 | 24.50000 | 1.158118 | .246824 | 9 | 8 |
| PRE39 | 75.0000 | 78.00000 | 30.00000 | -.634324 | .525874 | 9 | 8 |

MANN-WHITNEY *U* TEST RESULTS (continued)
PLC Section 1 vs. PLC Section 2 – pre-survey (continued)

| <u>Item</u> | <u>Rank Sum</u> <u>Section 1</u> | <u>Rank Sum</u> <u>Section 2</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Section 1</u> | <u>Valid n</u> <u>Section 2</u> |
|-------------|-------------------------------------|-------------------------------------|----------|-----------------------------|----------------|------------------------------------|------------------------------------|
| PRE40 | 89.0000 | 64.00000 | 28.00000 | .810558 | .417625 | 9 | 8 |
| PRE41 | 106.5000 | 46.50000 | 10.50000 | 2.792564 | .005232 | 9 | 8 |
| PRE42 | 91.5000 | 61.50000 | 25.50000 | 1.096367 | .272927 | 9 | 8 |
| PRE43 | 99.0000 | 54.00000 | 18.00000 | 1.824996 | .068011 | 9 | 8 |
| PRE44 | 99.0000 | 54.00000 | 18.00000 | 1.875431 | .060743 | 9 | 8 |
| PRE45 | 89.5000 | 63.50000 | 27.50000 | .923554 | .355726 | 9 | 8 |
| PRE46 | 82.0000 | 71.00000 | 35.00000 | .101389 | .919243 | 9 | 8 |
| PRE47 | 86.5000 | 66.50000 | 30.50000 | .549475 | .582683 | 9 | 8 |
| PRE48 | 103.0000 | 50.00000 | 14.00000 | 2.261533 | .023733 | 9 | 8 |
| PRE49 | 98.5000 | 54.50000 | 18.50000 | 1.768298 | .077021 | 9 | 8 |
| PRE50 | 105.0000 | 48.00000 | 12.00000 | 2.500575 | .012404 | 9 | 8 |
| PRE51 | 93.00000 | 60.00000 | 24.00000 | 1.32900 | .183858 | 9 | 8 |
| PRE52 | 85.50000 | 67.50000 | 31.50000 | .51097 | .609374 | 9 | 8 |
| PRE53 | 94.00000 | 59.00000 | 23.00000 | 1.42366 | .154555 | 9 | 8 |
| PRE54 | 81.00000 | 72.00000 | 36.00000 | 0.00000 | 1.000000 | 9 | 8 |
| PRE55 | 79.00000 | 74.00000 | 34.00000 | -.20445 | .838001 | 9 | 8 |

PLC Section 1 vs. PLC Section 2 – post-survey

| <u>Item</u> | <u>Rank Sum</u> <u>Section 1</u> | <u>Rank Sum</u> <u>Section 2</u> | <u>U</u> | <u>Z</u> <u>adjusted</u> | <u>p-level</u> | <u>Valid n</u> <u>Section 1</u> | <u>Valid n</u> <u>Section 2</u> |
|-------------|-------------------------------------|-------------------------------------|----------|-----------------------------|----------------|------------------------------------|------------------------------------|
| POST1 | 101.0000 | 52.00000 | 16.00000 | 2.214995 | .026767 | 9 | 8 |
| POST2 | 95.0000 | 58.00000 | 22.00000 | 1.484488 | .137689 | 9 | 8 |
| POST3 | 106.0000 | 47.00000 | 11.00000 | 2.644974 | .008174 | 9 | 8 |
| POST4 | 93.0000 | 60.00000 | 24.00000 | 1.738454 | .082140 | 9 | 8 |
| POST5 | 104.5000 | 48.50000 | 12.50000 | 2.415728 | .015709 | 9 | 8 |
| POST6 | 86.0000 | 67.00000 | 31.00000 | .528995 | .596813 | 9 | 8 |
| POST7 | 97.0000 | 56.00000 | 20.00000 | 1.605915 | .108302 | 9 | 8 |
| POST8 | 96.5000 | 56.50000 | 20.50000 | 1.593353 | .111091 | 9 | 8 |
| POST9 | 105.0000 | 48.00000 | 12.00000 | 2.748737 | .005986 | 9 | 8 |
| POST10 | 88.0000 | 65.00000 | 29.00000 | .742244 | .457945 | 9 | 8 |
| POST11 | 85.0000 | 68.00000 | 32.00000 | .424139 | .671467 | 9 | 8 |
| POST12 | 71.5000 | 81.50000 | 26.50000 | -.981387 | .326409 | 9 | 8 |
| POST13 | 95.5000 | 57.50000 | 21.50000 | 1.514030 | .130028 | 9 | 8 |
| POST14 | 96.0000 | 57.00000 | 21.00000 | 1.505545 | .132194 | 9 | 8 |
| POST15 | 93.0000 | 60.00000 | 24.00000 | 1.356815 | .174849 | 9 | 8 |
| POST16 | 64.0000 | 72.00000 | 19.00000 | -1.40625 | .159660 | 9 | 7 |
| POST17 | 86.0000 | 67.00000 | 31.00000 | .51220 | .608517 | 9 | 8 |
| POST18 | 70.5000 | 82.50000 | 25.50000 | -1.09400 | .273963 | 9 | 8 |
| POST19 | 73.0000 | 80.00000 | 28.00000 | -.83533 | .403540 | 9 | 8 |
| POST20 | 95.0000 | 58.00000 | 22.00000 | 1.45449 | .145819 | 9 | 8 |
| POST21 | 87.0000 | 66.00000 | 30.00000 | .61464 | .538799 | 9 | 8 |
| POST22 | 100.0000 | 53.00000 | 17.00000 | 1.96277 | .049681 | 9 | 8 |
| POST23 | 92.0000 | 61.00000 | 25.00000 | 1.12605 | .260152 | 9 | 8 |
| POST24 | 95.0000 | 58.00000 | 22.00000 | 1.45449 | .145819 | 9 | 8 |
| POST25 | 101.0000 | 52.00000 | 16.00000 | 2.04030 | .041328 | 9 | 8 |
| POST26 | 88.5000 | 64.50000 | 28.50000 | .85162 | .394432 | 9 | 8 |
| POST27 | 93.0000 | 60.00000 | 24.00000 | 1.31415 | .188806 | 9 | 8 |
| POST28 | 84.0000 | 69.00000 | 33.00000 | .30293 | .761944 | 9 | 8 |
| POST29 | 98.0000 | 55.00000 | 19.00000 | 1.69838 | .089446 | 9 | 8 |
| POST30 | 90.0000 | 63.00000 | 27.00000 | .92517 | .354883 | 9 | 8 |
| POST31 | 83.5000 | 69.50000 | 33.50000 | .264497 | .791398 | 9 | 8 |
| POST32 | 85.5000 | 67.50000 | 31.50000 | .476095 | .634010 | 9 | 8 |
| POST33 | 93.5000 | 59.50000 | 23.50000 | 1.277833 | .201318 | 9 | 8 |
| POST34 | 96.0000 | 57.00000 | 21.00000 | 1.566238 | .117303 | 9 | 8 |
| POST35 | 96.5000 | 56.50000 | 20.50000 | 1.567266 | .117062 | 9 | 8 |
| POST36 | 94.0000 | 59.00000 | 23.00000 | 1.312706 | .189291 | 9 | 8 |
| POST37 | 100.0000 | 53.00000 | 17.00000 | 1.969741 | .048877 | 9 | 8 |
| POST38 | 100.0000 | 53.00000 | 17.00000 | 1.921165 | .054720 | 9 | 8 |
| POST39 | 87.0000 | 66.00000 | 30.00000 | .634794 | .525568 | 9 | 8 |
| POST40 | 115.0000 | 38.00000 | 2.00000 | 3.385592 | .000711 | 9 | 8 |
| POST41 | 98.0000 | 55.00000 | 19.00000 | 1.718937 | .085636 | 9 | 8 |
| POST42 | 88.5000 | 64.50000 | 28.50000 | .770977 | .440726 | 9 | 8 |

MANN-WHITNEY *U* TEST RESULTS (continued)
PLC Section 1 vs. PLC Section 2 – post-survey (continued)

| <u>Item</u> | <u>Rank Sum Section 1</u> | <u>Rank Sum Section 2</u> | <u><i>U</i></u> | <u><i>Z</i> adjusted</u> | <u><i>p</i>-level</u> | <u>Valid <i>n</i> Section 1</u> | <u>Valid <i>n</i> Section 2</u> |
|-------------|-------------------------------|-------------------------------|-----------------|------------------------------|-----------------------|-------------------------------------|-------------------------------------|
| POST43 | 95.5000 | 57.50000 | 21.50000 | 1.479220 | .139091 | 9 | 8 |
| POST44 | 94.0000 | 59.00000 | 23.00000 | 1.317157 | .187795 | 9 | 8 |
| POST45 | 93.0000 | 60.00000 | 24.00000 | 1.246710 | .212513 | 9 | 8 |
| POST46 | 102.0000 | 51.00000 | 15.00000 | 2.129163 | .033248 | 9 | 8 |
| POST47 | 82.5000 | 70.50000 | 34.50000 | .153340 | .878131 | 9 | 8 |
| POST48 | 91.0000 | 62.00000 | 26.00000 | 1.022266 | .306663 | 9 | 8 |
| POST49 | 74.5000 | 78.50000 | 29.50000 | -.687693 | .491651 | 9 | 8 |
| POST50 | 89.5000 | 63.50000 | 27.50000 | .853142 | .393587 | 9 | 8 |
| POST51 | 97.0000 | 56.00000 | 20.00000 | 1.605915 | .108302 | 9 | 8 |
| POST52 | 90.0000 | 63.00000 | 27.00000 | .908796 | .363464 | 9 | 8 |
| POST53 | 89.0000 | 64.00000 | 28.00000 | .846391 | .397341 | 9 | 8 |
| POST54 | 93.5000 | 59.50000 | 23.50000 | 1.321508 | .186341 | 9 | 8 |
| POST55 | 107.0000 | 46.00000 | 10.00000 | 2.682115 | .007320 | 9 | 8 |
| POST56 | 94.0000 | 59.00000 | 23.00000 | 1.312706 | .189291 | 9 | 8 |
| POST57 | 104.0000 | 49.00000 | 13.00000 | 2.308503 | .020978 | 9 | 8 |
| POST58 | 98.0000 | 55.00000 | 19.00000 | 1.715458 | .086271 | 9 | 8 |
| POST59 | 102.0000 | 51.00000 | 15.00000 | 2.123393 | .033729 | 9 | 8 |
| POST60 | 92.5000 | 60.50000 | 24.50000 | 1.169956 | .242027 | 9 | 8 |
| POST61 | 78.0000 | 75.00000 | 33.00000 | -.32854 | .742508 | 9 | 8 |
| POST62 | 70.5000 | 82.50000 | 25.50000 | -1.25963 | .207812 | 9 | 8 |
| POST63 | 81.0000 | 72.00000 | 36.00000 | 0.00000 | 1.000000 | 9 | 8 |
| POST64 | 93.0000 | 60.00000 | 24.00000 | 1.32900 | .183858 | 9 | 8 |
| POST65 | 77.0000 | 76.00000 | 32.00000 | -.41676 | .676855 | 9 | 8 |
| POST66 | 100.0000 | 53.00000 | 17.00000 | 1.95314 | .050811 | 9 | 8 |
| POST67 | 93.0000 | 60.00000 | 24.00000 | 1.32900 | .183858 | 9 | 8 |
| POST68 | 88.5000 | 64.50000 | 28.50000 | .76301 | .445460 | 9 | 8 |
| POST69 | 65.0000 | 88.00000 | 20.00000 | -1.59953 | .109713 | 9 | 8 |
| POST70 | 75.0000 | 78.00000 | 30.00000 | -.60102 | .547833 | 9 | 8 |
| POST71 | 97.0000 | 56.00000 | 20.00000 | 2.07785 | .037731 | 9 | 8 |
| POST72 | 81.0000 | 72.00000 | 36.00000 | 0.00000 | 1.000000 | 9 | 8 |
| POST73 | 91.0000 | 62.00000 | 26.00000 | .99511 | .319690 | 9 | 8 |
| POST74 | 84.5000 | 68.50000 | 32.50000 | .41988 | .674578 | 9 | 8 |
| POST75 | 69.5000 | 83.50000 | 24.50000 | -1.15890 | .246507 | 9 | 8 |
| POST76 | 87.5000 | 65.50000 | 29.50000 | .65591 | .511886 | 9 | 8 |
| POST77 | 99.0000 | 54.00000 | 18.00000 | 1.79947 | .071954 | 9 | 8 |
| POST78 | 79.0000 | 74.00000 | 34.00000 | -.20488 | .837668 | 9 | 8 |
| POST79 | 95.5000 | 57.50000 | 21.50000 | 1.50322 | .132791 | 9 | 8 |
| POST80 | 81.5000 | 71.50000 | 35.50000 | .05140 | .959008 | 9 | 8 |
| POST81 | 86.0000 | 67.00000 | 31.00000 | .51946 | .603442 | 9 | 8 |
| POST82 | 95.0000 | 58.00000 | 22.00000 | 1.41944 | .155780 | 9 | 8 |
| POST83 | 89.0000 | 64.00000 | 28.00000 | .85531 | .392387 | 9 | 8 |
| POST84 | 100.0000 | 53.00000 | 17.00000 | 1.94231 | .052109 | 9 | 8 |
| POST85 | 97.5000 | 55.50000 | 19.50000 | 1.71915 | .085598 | 9 | 8 |
| POST86 | 86.50000 | 66.50000 | 30.50000 | .60232 | .546967 | 9 | 8 |
| POST87 | 82.50000 | 70.50000 | 34.50000 | .15355 | .877964 | 9 | 8 |
| POST88 | 83.50000 | 69.50000 | 33.50000 | .25699 | .797186 | 9 | 8 |
| POST89 | 93.00000 | 60.00000 | 24.00000 | 1.44648 | .148052 | 9 | 8 |
| POST90 | 81.00000 | 72.00000 | 36.00000 | 0.00000 | 1.000000 | 9 | 8 |
| POST102 | 79.00000 | 74.00000 | 34.00000 | -.23970 | .810563 | 9 | 8 |
| POST103 | 87.00000 | 66.00000 | 30.00000 | .59982 | .548628 | 9 | 8 |
| POST104 | 81.00000 | 72.00000 | 36.00000 | 0.00000 | 1.000000 | 9 | 8 |
| POST105 | 92.50000 | 60.50000 | 24.50000 | 1.18799 | .234844 | 9 | 8 |
| POST106 | 98.00000 | 55.00000 | 19.00000 | 1.75369 | .079493 | 9 | 8 |
| POST107 | 84.00000 | 69.00000 | 33.00000 | .30212 | .762564 | 9 | 8 |
| POST108 | 85.50000 | 67.50000 | 31.50000 | .44987 | .652809 | 9 | 8 |
| POST109 | 93.50000 | 59.50000 | 23.50000 | 1.27695 | .201629 | 9 | 8 |
| POST110 | 86.50000 | 66.50000 | 30.50000 | .57059 | .568279 | 9 | 8 |
| POST111 | 74.00000 | 79.00000 | 29.00000 | -.69658 | .486073 | 9 | 8 |
| POST112 | 99.50000 | 53.50000 | 17.50000 | 1.85560 | .063519 | 9 | 8 |
| POST113 | 79.00000 | 74.00000 | 34.00000 | -.22906 | .818823 | 9 | 8 |
| POST114 | 80.50000 | 72.50000 | 35.50000 | -.05677 | .954725 | 9 | 8 |
| POST115 | 70.50000 | 82.50000 | 25.50000 | -1.04693 | .295142 | 9 | 8 |
| POST116 | 87.00000 | 66.00000 | 30.00000 | .596285 | .550989 | 9 | 8 |
| POST117 | 99.00000 | 54.00000 | 18.00000 | 1.875431 | .060743 | 9 | 8 |

MANN-WHITNEY *U* TEST RESULTS (continued)
PLC Section 1 vs. PLC Section 2 – post-survey (continued)

| Item | Rank Sum Section 1 | Rank Sum Section 2 | <i>U</i> | <i>Z</i> adjusted | <i>p</i>-level | Valid <i>n</i> Section 1 | Valid <i>n</i> Section 2 |
|-------------|-------------------------------|-------------------------------|-----------------|------------------------------|-----------------------|-------------------------------------|-------------------------------------|
| POST118 | 95.0000 | 58.00000 | 22.00000 | 1.524725 | .127338 | 9 | 8 |
| POST119 | 88.0000 | 65.00000 | 29.00000 | .727247 | .467080 | 9 | 8 |
| POST120 | 86.5000 | 66.50000 | 30.50000 | .561084 | .574744 | 9 | 8 |
| POST121 | 80.5000 | 55.50000 | 27.50000 | .454553 | .649434 | 9 | 7 |
| POST122 | 89.0000 | 64.00000 | 28.00000 | .829365 | .406904 | 9 | 8 |
| POST123 | 79.5000 | 56.50000 | 28.50000 | .335279 | .737417 | 9 | 7 |
| POST124 | 93.0000 | 60.00000 | 24.00000 | 1.328997 | .183858 | 9 | 8 |
| POST125 | 99.5000 | 53.50000 | 17.50000 | 1.856839 | .063343 | 9 | 8 |
| POST126 | 105.0000 | 48.00000 | 12.00000 | 2.458545 | .013955 | 9 | 8 |
| POST127 | 97.5000 | 55.50000 | 19.50000 | 1.704514 | .088295 | 9 | 8 |
| POST128 | 103.0000 | 50.00000 | 14.00000 | 2.266292 | .023440 | 9 | 8 |
| POST129 | 92.0000 | 61.00000 | 25.00000 | 1.146097 | .251764 | 9 | 8 |
| POST130 | 86.50000 | 66.50000 | 30.50000 | .547310 | .584169 | 9 | 8 |
| POST131 | 93.50000 | 59.50000 | 23.50000 | 1.291298 | .196610 | 9 | 8 |
| POST132 | 91.00000 | 62.00000 | 26.00000 | 1.133560 | .256988 | 9 | 8 |
| POST133 | 85.50000 | 67.50000 | 31.50000 | .451664 | .651514 | 9 | 8 |
| POST134 | 94.50000 | 58.50000 | 22.50000 | 1.363195 | .172831 | 9 | 8 |
| POST135 | 75.50000 | 60.50000 | 30.50000 | -.109194 | .913049 | 9 | 7 |
| POST136 | 79.50000 | 73.50000 | 34.50000 | -.153340 | .878131 | 9 | 8 |
| POST137 | 77.00000 | 59.00000 | 31.00000 | .054726 | .956357 | 9 | 7 |
| POST138 | 73.00000 | 80.00000 | 28.00000 | -.916246 | .359545 | 9 | 8 |
| POST139 | 98.50000 | 54.50000 | 18.50000 | 1.988810 | .046731 | 9 | 8 |
| POST140 | 89.00000 | 64.00000 | 28.00000 | .822376 | .410869 | 9 | 8 |
| POST141 | 85.00000 | 68.00000 | 32.00000 | .405279 | .685275 | 9 | 8 |
| POST142 | 87.00000 | 66.00000 | 30.00000 | .616782 | .537383 | 9 | 8 |
| POST143 | 83.00000 | 70.00000 | 34.00000 | .207785 | .835398 | 9 | 8 |

WILCOXON MATCHED PAIRS TEST RESULTS

PLC

| Item pair | Valid <i>n</i> | <i>T</i> | <i>Z</i> | <i>p</i> -level |
|----------------|----------------|----------|----------|-----------------|
| PRE1 & POST1 | 17 | 3.00000 | 1.213560 | .224925 |
| PRE2 & POST2 | 17 | 10.50000 | 1.050210 | .293629 |
| PRE3 & POST3 | 17 | 12.00000 | .338062 | .735319 |
| PRE4 & POST4 | 17 | 3.00000 | 1.572427 | .115861 |
| PRE5 & POST5 | 17 | 6.50000 | .269680 | .787408 |
| PRE6 & POST6 | 17 | 14.50000 | .490098 | .624068 |
| PRE7 & POST7 | 17 | 3.00000 | 2.310161 | .020886 |
| PRE8 & POST8 | 17 | 30.50000 | .222277 | .824100 |
| PRE9 & POST9 | 17 | 12.00000 | .840168 | .400820 |
| PRE10 & POST10 | 17 | 16.00000 | .770054 | .441274 |
| PRE11 & POST11 | 17 | 16.50000 | .710819 | .477202 |
| PRE12 & POST12 | 17 | 31.00000 | .177822 | .858864 |
| PRE13 & POST13 | 17 | 7.00000 | .733799 | .463076 |
| PRE14 & POST14 | 17 | 27.50000 | 0.000000 | 1.000000 |
| PRE15 & POST15 | 17 | 3.00000 | 1.213560 | .224925 |
| PRE16 & POST16 | 16 | 8.00000 | 1.717812 | .085841 |
| PRE17 & POST17 | 17 | 4.00000 | 1.960392 | .049959 |
| PRE18 & POST18 | 17 | 13.50000 | 1.066228 | .286329 |
| PRE19 & POST19 | 17 | 8.50000 | .929670 | .352549 |
| PRE20 & POST20 | 17 | 12.00000 | .840168 | .400820 |
| PRE21 & POST21 | 17 | 20.00000 | 1.155841 | .247755 |
| PRE22 & POST22 | 17 | 18.00000 | .533114 | .593958 |
| PRE23 & POST23 | 17 | 0.00000 | 2.201398 | .027715 |
| PRE24 & POST24 | 17 | 7.00000 | 1.183216 | .236732 |
| PRE25 & POST25 | 17 | 10.00000 | 1.480872 | .138650 |
| PRE26 & POST26 | 17 | 7.00000 | .733799 | .463076 |
| PRE27 & POST27 | 17 | 7.50000 | 0.000000 | 1.000000 |
| PRE28 & POST28 | 17 | 27.50000 | .489010 | .624838 |
| PRE29 & POST29 | 17 | 7.00000 | 1.540308 | .123495 |
| PRE30 & POST30 | 17 | 12.00000 | .840168 | .400820 |
| PRE31 & POST61 | 17 | 8.00000 | 1.400280 | .161439 |
| PRE32 & POST62 | 17 | 8.00000 | 1.014185 | .310502 |
| PRE33 & POST63 | 17 | 8.00000 | 1.400280 | .161439 |
| PRE34 & POST64 | 17 | 6.00000 | .404520 | .685833 |
| PRE35 & POST65 | 17 | 22.00000 | .059235 | .952765 |
| PRE36 & POST66 | 17 | 21.00000 | .662541 | .507629 |
| PRE37 & POST67 | 17 | 2.50000 | .912871 | .361317 |
| PRE38 & POST68 | 17 | 14.00000 | 1.376047 | .168817 |
| PRE39 & POST69 | 17 | 27.50000 | .902134 | .366992 |
| PRE40 & POST70 | 17 | 31.50000 | .133366 | .893905 |
| PRE41 & POST71 | 17 | 2.00000 | .534522 | .592984 |
| PRE42 & POST72 | 17 | 8.00000 | 1.014185 | .310502 |
| PRE43 & POST73 | 17 | 28.00000 | .444554 | .656645 |
| PRE44 & POST74 | 17 | 20.00000 | .764471 | .444592 |
| PRE45 & POST75 | 17 | 20.00000 | .296174 | .767099 |
| PRE46 & POST81 | 17 | 10.00000 | 1.120224 | .262627 |
| PRE47 & POST82 | 17 | 25.50000 | .666831 | .504885 |
| PRE48 & POST83 | 17 | 22.50000 | 0.000000 | 1.000000 |
| PRE49 & POST84 | 17 | 9.00000 | .314485 | .753154 |
| PRE50 & POST85 | 17 | 10.50000 | .591608 | .554117 |
| PRE51 & POST86 | 17 | 6.00000 | .404520 | .685833 |
| PRE52 & POST87 | 17 | 19.00000 | .866400 | .386277 |
| PRE53 & POST88 | 17 | 12.00000 | 1.579906 | .114138 |
| PRE54 & POST89 | 17 | 6.00000 | .943456 | .345455 |
| PRE55 & POST90 | 17 | 31.50000 | .133366 | .893905 |

WILCOXON MATCHED PAIRS TEST RESULTS (continued)
PLC Section 1 only

| <u>Item pair</u> | <u>Valid n</u> | <u>T</u> | <u>Z</u> | <u>p-level</u> |
|------------------|----------------|----------|----------|----------------|
| PRE1 & POST1 | 9 | 2.50000 | | |
| PRE2 & POST2 | 9 | 5.00000 | .674200 | .500189 |
| PRE3 & POST3 | 9 | 2.50000 | .912871 | .361317 |
| PRE4 & POST4 | 9 | 2.00000 | 1.095445 | .273330 |
| PRE5 & POST5 | 9 | 1.50000 | .801784 | .422684 |
| PRE6 & POST6 | 9 | 3.50000 | .547723 | .583886 |
| PRE7 & POST7 | 9 | 2.50000 | 1.677256 | .093502 |
| PRE8 & POST8 | 9 | 16.00000 | .280056 | .779436 |
| PRE9 & POST9 | 9 | 7.50000 | 0.000000 | 1.000000 |
| PRE10 & POST10 | 9 | 3.50000 | .547723 | .583886 |
| PRE11 & POST11 | 9 | 9.00000 | .314485 | .753154 |
| PRE12 & POST12 | 9 | 2.00000 | 1.483240 | .138021 |
| PRE13 & POST13 | 9 | 14.00000 | | |
| PRE14 & POST14 | 9 | 12.00000 | .338062 | .735319 |
| PRE15 & POST15 | 9 | 2.00000 | .534522 | .592984 |
| PRE16 & POST16 | 9 | 6.00000 | .943456 | .345455 |
| PRE17 & POST17 | 9 | 0.00000 | 1.825742 | .067898 |
| PRE18 & POST18 | 9 | 2.50000 | .912871 | .361317 |
| PRE19 & POST19 | 9 | 2.00000 | | |
| PRE20 & POST20 | 9 | 9.00000 | .314485 | .753154 |
| PRE21 & POST21 | 9 | 5.00000 | .674200 | .500189 |
| PRE22 & POST22 | 9 | 2.50000 | .912871 | .361317 |
| PRE23 & POST23 | 9 | 0.00000 | 1.603567 | .108819 |
| PRE24 & POST24 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE25 & POST25 | 9 | 3.00000 | 1.213560 | .224925 |
| PRE26 & POST26 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE27 & POST27 | 9 | 2.00000 | | |
| PRE28 & POST28 | 9 | 9.00000 | .314485 | .753154 |
| PRE29 & POST29 | 9 | 2.00000 | 1.095445 | .273330 |
| PRE30 & POST30 | 9 | 9.00000 | .314485 | .753154 |
| PRE31 & POST61 | 9 | 2.50000 | 1.348400 | .177539 |
| PRE32 & POST62 | 9 | 0.00000 | 1.825742 | .067898 |
| PRE33 & POST63 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE34 & POST64 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE35 & POST65 | 9 | 4.00000 | .943880 | .345238 |
| PRE36 & POST66 | 9 | 10.50000 | .591608 | .554117 |
| PRE37 & POST67 | 9 | 2.00000 | .534522 | .592984 |
| PRE38 & POST68 | 9 | 2.50000 | 1.348400 | .177539 |
| PRE39 & POST69 | 9 | 2.50000 | 1.677256 | .093502 |
| PRE40 & POST70 | 9 | 3.50000 | 1.078720 | .280721 |
| PRE41 & POST71 | 9 | 5.00000 | | |
| PRE42 & POST72 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE43 & POST73 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE44 & POST74 | 9 | 2.00000 | .534522 | .592984 |
| PRE45 & POST75 | 9 | 0.00000 | 1.825742 | .067898 |
| PRE46 & POST81 | 9 | 1.50000 | .801784 | .422684 |
| PRE47 & POST82 | 9 | 7.50000 | 0.000000 | 1.000000 |
| PRE48 & POST83 | 9 | 6.00000 | .943456 | .345455 |
| PRE49 & POST84 | 9 | 5.00000 | .674200 | .500189 |
| PRE50 & POST85 | 9 | 5.00000 | .674200 | .500189 |
| PRE51 & POST86 | 9 | 5.00000 | 0.000000 | 1.000000 |
| PRE52 & POST87 | 9 | 8.50000 | .419314 | .674990 |
| PRE53 & POST88 | 9 | 5.00000 | .674200 | .500189 |
| PRE54 & POST89 | 9 | 3.00000 | 0.000000 | 1.000000 |
| PRE55 & POST90 | 9 | 9.00000 | .314485 | .753154 |

WILCOXON MATCHED PAIRS TEST RESULTS (continued)
PLC Section 2 only

| <u>Item pair</u> | <u>Valid n</u> | <u>T</u> | <u>Z</u> | <u>p-level</u> |
|------------------|----------------|----------|----------|----------------|
| PRE1 & POST1 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE2 & POST2 | 8 | 1.50000 | .801784 | .422684 |
| PRE3 & POST3 | 8 | 2.00000 | .534522 | .592984 |
| PRE4 & POST4 | 8 | 4.00000 | | |
| PRE5 & POST5 | 8 | 3.00000 | | |
| PRE6 & POST6 | 8 | 5.00000 | 0.000000 | 1.000000 |
| PRE7 & POST7 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE8 & POST8 | 8 | 3.00000 | 0.000000 | 1.000000 |
| PRE9 & POST9 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE10 & POST10 | 8 | 5.00000 | .674200 | .500189 |
| PRE11 & POST11 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE12 & POST12 | 8 | 2.50000 | 1.677256 | .093502 |
| PRE13 & POST13 | 8 | 2.50000 | .912871 | .361317 |
| PRE14 & POST14 | 8 | 2.00000 | .534522 | .592984 |
| PRE15 & POST15 | 8 | 0.00000 | | |
| PRE16 & POST16 | 7 | 0.000000 | 1.603567 | .108819 |
| PRE17 & POST17 | 8 | 2.500000 | .912871 | .361317 |
| PRE18 & POST18 | 8 | 5.000000 | .674200 | .500189 |
| PRE19 & POST19 | 8 | 2.500000 | 1.677256 | .093502 |
| PRE20 & POST20 | 8 | 3.000000 | | |
| PRE21 & POST21 | 8 | 6.000000 | .943456 | .345455 |
| PRE22 & POST22 | 8 | 7.500000 | 0.000000 | 1.000000 |
| PRE23 & POST23 | 8 | 0.000000 | 1.603567 | .108819 |
| PRE24 & POST24 | 8 | 0.000000 | 1.603567 | .108819 |
| PRE25 & POST25 | 8 | 2.500000 | .912871 | .361317 |
| PRE26 & POST26 | 8 | 0.000000 | | |
| PRE27 & POST27 | 8 | 2.000000 | .534522 | .592984 |
| PRE28 & POST28 | 8 | 3.000000 | 1.213560 | .224925 |
| PRE29 & POST29 | 8 | 2.000000 | 1.095445 | .273330 |
| PRE30 & POST30 | 8 | 0.000000 | | |
| PRE31 & POST61 | 8 | 2.00000 | .534522 | .592984 |
| PRE32 & POST62 | 8 | 2.00000 | .534522 | .592984 |
| PRE33 & POST63 | 8 | 0.00000 | 1.825742 | .067898 |
| PRE34 & POST64 | 8 | 2.50000 | | |
| PRE35 & POST65 | 8 | 3.00000 | .730297 | .465214 |
| PRE36 & POST66 | 8 | 2.50000 | .267261 | .789270 |
| PRE37 & POST67 | 8 | 7.50000 | | |
| PRE38 & POST68 | 8 | 5.00000 | .674200 | .500189 |
| PRE39 & POST69 | 8 | 9.50000 | .209657 | .833937 |
| PRE40 & POST70 | 8 | 6.00000 | .943456 | .345455 |
| PRE41 & POST71 | 8 | 0.00000 | | |
| PRE42 & POST72 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE43 & POST73 | 8 | 11.00000 | .507093 | .612093 |
| PRE44 & POST74 | 8 | 7.00000 | 1.183216 | .236732 |
| PRE45 & POST75 | 8 | 2.00000 | 1.483240 | .138021 |
| PRE46 & POST81 | 8 | 4.50000 | .809040 | .418498 |
| PRE47 & POST82 | 8 | 6.00000 | .943456 | .345455 |
| PRE48 & POST83 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE49 & POST84 | 8 | 2.50000 | | |
| PRE50 & POST85 | 8 | 0.00000 | | |
| PRE51 & POST86 | 8 | 0.00000 | | |
| PRE52 & POST87 | 8 | 2.50000 | .912871 | .361317 |
| PRE53 & POST88 | 8 | 2.00000 | 1.483240 | .138021 |
| PRE54 & POST89 | 8 | 0.00000 | 1.603567 | .108819 |
| PRE55 & POST90 | 8 | 7.00000 | .134840 | .892739 |

WILCOXON MATCHED PAIRS TEST RESULTS (continued)**Control**

| <u>Item pair</u> | <u>Valid n</u> | <u>T</u> | <u>Z</u> | <u>p-level</u> |
|------------------|----------------|----------|----------|----------------|
| PRE1 & POST1 | 14 | 2.50000 | .912871 | .361317 |
| PRE2 & POST2 | 13 | 12.00000 | .338062 | .735319 |
| PRE3 & POST3 | 14 | 7.00000 | .733799 | .463076 |
| PRE4 & POST4 | 14 | 2.00000 | .534522 | .592984 |
| PRE5 & POST5 | 14 | 16.00000 | .280056 | .779436 |
| PRE6 & POST6 | 14 | 20.00000 | .296174 | .767099 |
| PRE7 & POST7 | 14 | 15.00000 | .888523 | .374266 |
| PRE8 & POST8 | 14 | 8.00000 | 1.014185 | .310502 |
| PRE9 & POST9 | 14 | 12.00000 | .338062 | .735319 |
| PRE10 & POST10 | 14 | 5.00000 | .674200 | .500189 |
| PRE11 & POST11 | 14 | 7.00000 | .733799 | .463076 |
| PRE12 & POST12 | 14 | 6.00000 | .404520 | .685833 |
| PRE13 & POST13 | 14 | 16.50000 | 1.121224 | .262201 |
| PRE14 & POST14 | 14 | 7.00000 | .733799 | .463076 |
| PRE15 & POST15 | 14 | 16.00000 | .280056 | .779436 |
| PRE16 & POST16 | 14 | 14.00000 | 1.006993 | .313946 |
| PRE17 & POST17 | 14 | 10.00000 | 1.480872 | .138650 |
| PRE18 & POST18 | 14 | 18.00000 | .533114 | .593958 |
| PRE19 & POST19 | 14 | 18.00000 | .968330 | .332887 |
| PRE20 & POST20 | 14 | 14.00000 | .560112 | .575407 |
| PRE21 & POST21 | 14 | 27.50000 | 0.000000 | 1.000000 |
| PRE22 & POST22 | 14 | 6.50000 | 1.267731 | .204903 |
| PRE23 & POST23 | 14 | 6.50000 | .269680 | .787408 |
| PRE24 & POST24 | 14 | 7.00000 | .733799 | .463076 |
| PRE25 & POST25 | 14 | 13.50000 | 1.733761 | .082970 |
| PRE26 & POST26 | 14 | 30.00000 | .266733 | .789677 |
| PRE27 & POST27 | 14 | 3.00000 | 1.572427 | .115861 |
| PRE28 & POST28 | 14 | 0.00000 | 2.366432 | .017966 |
| PRE29 & POST29 | 14 | 0.00000 | 1.825742 | .067898 |
| PRE30 & POST30 | 14 | 3.00000 | 1.572427 | .115861 |
| PRE31 & POST61 | 14 | 8.00000 | 1.014185 | .310502 |
| PRE32 & POST62 | 14 | 9.00000 | 1.885695 | .059345 |
| PRE33 & POST63 | 14 | 6.00000 | .943456 | .345455 |
| PRE34 & POST64 | 14 | 23.00000 | .458682 | .646465 |
| PRE35 & POST65 | 14 | 9.00000 | .314485 | .753154 |
| PRE36 & POST66 | 14 | 20.00000 | .764471 | .444592 |
| PRE37 & POST67 | 14 | 8.00000 | 1.014185 | .310502 |
| PRE38 & POST68 | 14 | 9.00000 | .314485 | .753154 |
| PRE39 & POST69 | 14 | 4.00000 | 1.690308 | .090979 |
| PRE40 & POST70 | 14 | 10.00000 | 1.120224 | .262627 |
| PRE41 & POST71 | 14 | 5.00000 | .674200 | .500189 |
| PRE42 & POST72 | 13 | 9.00000 | 1.260252 | .207588 |
| PRE43 & POST73 | 14 | 14.00000 | .560112 | .575407 |
| PRE44 & POST74 | 14 | 2.00000 | .534522 | .592984 |
| PRE45 & POST75 | 14 | 12.00000 | .840168 | .400820 |
| PRE46 & POST81 | 14 | 2.50000 | .912871 | .361317 |
| PRE47 & POST82 | 13 | 4.00000 | 1.690308 | .090979 |
| PRE48 & POST83 | 14 | 3.50000 | 1.467599 | .142223 |
| PRE49 & POST84 | 14 | 10.50000 | .591608 | .554117 |
| PRE50 & POST85 | 14 | 10.50000 | 1.050210 | .293629 |
| PRE51 & POST86 | 14 | 3.00000 | 1.213560 | .224925 |
| PRE52 & POST87 | 14 | 6.00000 | .943456 | .345455 |
| PRE53 & POST88 | 14 | 7.00000 | 1.540308 | .123495 |
| PRE54 & POST89 | 14 | 2.00000 | 1.095445 | .273330 |
| PRE55 & POST90 | 14 | 0.00000 | 2.022600 | .043123 |

DESCRIPTIVE STATISTICS
PLC

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| PRE1 | 17 | 1.64706 | 1.00000 | 3.00000 | .701888 |
| PRE2 | 17 | 1.64706 | 1.00000 | 3.00000 | .701888 |
| PRE3 | 17 | 1.64706 | 1.00000 | 3.00000 | .701888 |
| PRE4 | 17 | 1.52941 | 1.00000 | 3.00000 | .717430 |
| PRE5 | 17 | 2.17647 | 1.00000 | 3.00000 | .727607 |
| PRE6 | 17 | 1.82353 | 1.00000 | 3.00000 | .727607 |
| PRE7 | 17 | 1.58824 | 1.00000 | 3.00000 | .795206 |
| PRE8 | 17 | 1.76471 | 1.00000 | 3.00000 | .752447 |
| PRE9 | 17 | 1.58824 | 1.00000 | 3.00000 | .618347 |
| PRE10 | 17 | 1.88235 | 1.00000 | 3.00000 | .781213 |
| PRE11 | 17 | 2.17647 | 1.00000 | 3.00000 | .727607 |
| PRE12 | 17 | 1.94118 | 1.00000 | 3.00000 | .747545 |
| PRE13 | 17 | 2.05882 | 1.00000 | 4.00000 | .899346 |
| PRE14 | 17 | 2.17647 | 1.00000 | 3.00000 | .635934 |
| PRE15 | 17 | 2.00000 | 1.00000 | 4.00000 | .790569 |
| PRE16 | 17 | 2.11765 | 1.00000 | 3.00000 | .857493 |
| PRE17 | 17 | 1.70588 | 1.00000 | 3.00000 | .685994 |
| PRE18 | 17 | 2.23529 | 1.00000 | 3.00000 | .831370 |
| PRE19 | 17 | 1.47059 | 1.00000 | 3.00000 | .717430 |
| PRE20 | 17 | 1.58824 | 1.00000 | 3.00000 | .712287 |
| PRE21 | 17 | 1.58824 | 1.00000 | 3.00000 | .618347 |
| PRE22 | 17 | 1.70588 | 1.00000 | 3.00000 | .771744 |
| PRE23 | 17 | 1.41176 | 1.00000 | 3.00000 | .712287 |
| PRE24 | 17 | 1.52941 | 1.00000 | 3.00000 | .717430 |
| PRE25 | 17 | 1.76471 | 1.00000 | 3.00000 | .664211 |
| PRE26 | 17 | 1.82353 | 1.00000 | 4.00000 | .882843 |
| PRE27 | 17 | 1.82353 | 1.00000 | 4.00000 | .951006 |
| PRE28 | 17 | 2.05882 | 1.00000 | 3.00000 | .747545 |
| PRE29 | 17 | 1.82353 | 1.00000 | 3.00000 | .808957 |
| PRE30 | 17 | 1.64706 | 1.00000 | 3.00000 | .785905 |
| PRE31 | 17 | 2.11765 | 1.00000 | 3.00000 | .485071 |
| PRE32 | 17 | 2.11765 | 1.00000 | 3.00000 | .600245 |
| PRE33 | 17 | 1.58824 | 1.00000 | 3.00000 | .712287 |
| PRE34 | 17 | 1.41176 | 1.00000 | 3.00000 | .618347 |
| PRE35 | 17 | 3.94118 | 1.00000 | 5.00000 | 1.297622 |
| PRE36 | 17 | 2.05882 | 1.00000 | 4.00000 | .899346 |
| PRE37 | 17 | 1.35294 | 1.00000 | 3.00000 | .606339 |
| PRE38 | 17 | 2.64706 | 1.00000 | 5.00000 | 1.114741 |
| PRE39 | 17 | 3.47059 | 1.00000 | 5.00000 | .874475 |
| PRE40 | 17 | 3.70588 | 1.00000 | 5.00000 | 1.531531 |
| PRE41 | 17 | 1.82353 | 1.00000 | 3.00000 | .635934 |
| PRE42 | 17 | 1.82353 | 1.00000 | 3.00000 | .727607 |
| PRE43 | 17 | 2.47059 | 1.00000 | 4.00000 | .943242 |
| PRE44 | 17 | 1.88235 | 1.00000 | 4.00000 | .857493 |
| PRE45 | 17 | 2.58824 | 1.00000 | 4.00000 | .795206 |
| PRE46 | 17 | 2.52941 | 1.00000 | 4.00000 | .943242 |
| PRE47 | 17 | 2.52941 | 1.00000 | 4.00000 | 1.067570 |
| PRE48 | 17 | 1.82353 | 1.00000 | 3.00000 | .808957 |
| PRE49 | 17 | 2.11765 | 1.00000 | 5.00000 | 1.218726 |
| PRE50 | 17 | 1.94118 | 1.00000 | 4.00000 | .966345 |
| PRE51 | 17 | 1.47059 | 1.00000 | 3.00000 | .624264 |
| PRE52 | 17 | 2.29412 | 1.00000 | 4.00000 | .685994 |
| PRE53 | 17 | 1.52941 | 1.00000 | 3.00000 | .717430 |
| PRE54 | 17 | 1.52941 | 1.00000 | 3.00000 | .624264 |
| PRE55 | 17 | 2.82353 | 1.00000 | 5.00000 | 1.131111 |
| POST1 | 17 | 1.470588 | 1.000000 | 3.000000 | .624264 |
| POST2 | 17 | 1.882353 | 1.000000 | 3.000000 | .696631 |
| POST3 | 17 | 1.705882 | 1.000000 | 3.000000 | .685994 |
| POST4 | 17 | 1.235294 | 1.000000 | 3.000000 | .562296 |
| POST5 | 17 | 2.117647 | 1.000000 | 3.000000 | .781213 |
| POST6 | 17 | 1.705882 | 1.000000 | 3.000000 | .685994 |
| POST7 | 17 | 2.294118 | 1.000000 | 4.000000 | .985184 |
| POST8 | 17 | 1.823529 | 1.000000 | 3.000000 | .808957 |
| POST9 | 17 | 1.411765 | 1.000000 | 3.000000 | .618347 |

DESCRIPTIVE STATISTICS (continued)
PLC (continued)

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST10 | 17 | 1.647059 | 1.000000 | 3.000000 | .785905 |
| POST11 | 17 | 2.352941 | 1.000000 | 3.000000 | .785905 |
| POST12 | 17 | 2.000000 | 1.000000 | 4.000000 | .866025 |
| POST13 | 17 | 2.176471 | 1.000000 | 3.000000 | .727607 |
| POST14 | 17 | 2.176471 | 1.000000 | 4.000000 | 1.074436 |
| POST15 | 17 | 2.176471 | 1.000000 | 4.000000 | .727607 |
| POST16 | 16 | 2.562500 | 1.000000 | 4.000000 | .892095 |
| POST17 | 17 | 2.117647 | 1.000000 | 3.000000 | .857493 |
| POST18 | 17 | 2.529412 | 1.000000 | 4.000000 | .799816 |
| POST19 | 17 | 1.705882 | 1.000000 | 3.000000 | .771744 |
| POST20 | 17 | 1.764706 | 1.000000 | 3.000000 | .752447 |
| POST21 | 17 | 1.882353 | 1.000000 | 3.000000 | .857493 |
| POST22 | 17 | 1.823529 | 1.000000 | 4.000000 | .951006 |
| POST23 | 17 | 1.941176 | 1.000000 | 4.000000 | .899346 |
| POST24 | 17 | 1.764706 | 1.000000 | 3.000000 | .752447 |
| POST25 | 17 | 2.058824 | 1.000000 | 3.000000 | .826936 |
| POST26 | 17 | 1.941176 | 1.000000 | 4.000000 | .747545 |
| POST27 | 17 | 1.823529 | 1.000000 | 3.000000 | .635934 |
| POST28 | 17 | 2.176471 | 1.000000 | 4.000000 | .951006 |
| POST29 | 17 | 2.235294 | 1.000000 | 4.000000 | 1.147247 |
| POST30 | 17 | 1.823529 | 1.000000 | 3.000000 | .808957 |
| POST31 | 17 | 1.705882 | 1.000000 | 3.000000 | .685994 |
| POST32 | 17 | 2.294118 | 1.000000 | 4.000000 | .771744 |
| POST33 | 17 | 2.529412 | 1.000000 | 4.000000 | .874475 |
| POST34 | 17 | 2.294118 | 1.000000 | 3.000000 | .771744 |
| POST35 | 17 | 2.411765 | 1.000000 | 4.000000 | 1.003670 |
| POST36 | 17 | 2.411765 | 1.000000 | 4.000000 | .939336 |
| POST37 | 17 | 1.823529 | 1.000000 | 4.000000 | .882843 |
| POST38 | 17 | 2.235294 | 1.000000 | 4.000000 | .970143 |
| POST39 | 17 | 1.941176 | 1.000000 | 4.000000 | .826936 |
| POST40 | 17 | 2.411765 | 1.000000 | 4.000000 | 1.064121 |
| POST41 | 17 | 2.764706 | 1.000000 | 4.000000 | .970143 |
| POST42 | 17 | 2.176471 | 1.000000 | 3.000000 | .808957 |
| POST43 | 17 | 1.941176 | 1.000000 | 3.000000 | .826936 |
| POST44 | 17 | 3.000000 | 1.000000 | 4.000000 | .935414 |
| POST45 | 17 | 2.235294 | 1.000000 | 3.000000 | .752447 |
| POST46 | 17 | 2.647059 | 1.000000 | 4.000000 | .931476 |
| POST47 | 17 | 2.647059 | 1.000000 | 5.000000 | 1.114741 |
| POST48 | 17 | 2.470588 | 1.000000 | 5.000000 | 1.230734 |
| POST49 | 17 | 1.941176 | 1.000000 | 4.000000 | .826936 |
| POST50 | 17 | 2.352941 | 1.000000 | 4.000000 | .996317 |
| POST51 | 17 | 2.294118 | 1.000000 | 4.000000 | 1.046704 |
| POST52 | 17 | 2.058824 | 1.000000 | 4.000000 | .966345 |
| POST53 | 17 | 2.705882 | 1.000000 | 4.000000 | .771744 |
| POST54 | 17 | 2.294118 | 1.000000 | 3.000000 | .848875 |
| POST55 | 17 | 2.588235 | 1.000000 | 4.000000 | .870260 |
| POST56 | 17 | 2.411765 | 1.000000 | 4.000000 | .939336 |
| POST57 | 17 | 2.294118 | 1.000000 | 4.000000 | .985184 |
| POST58 | 17 | 2.588235 | 1.000000 | 4.000000 | 1.003670 |
| POST59 | 17 | 2.411765 | 1.000000 | 4.000000 | 1.003670 |
| POST60 | 17 | 2.294118 | 1.000000 | 4.000000 | .919559 |
| POST61 | 17 | 1.823529 | 1.000000 | 3.000000 | .635934 |
| POST62 | 17 | 1.941176 | 1.000000 | 3.000000 | .555719 |
| POST63 | 17 | 1.882353 | 1.000000 | 3.000000 | .696631 |
| POST64 | 17 | 1.470588 | 1.000000 | 3.000000 | .624264 |
| POST65 | 17 | 4.058824 | 1.000000 | 5.000000 | 1.028992 |
| POST66 | 17 | 1.882353 | 1.000000 | 3.000000 | .781213 |
| POST67 | 17 | 1.470588 | 1.000000 | 3.000000 | .624264 |
| POST68 | 17 | 2.294118 | 1.000000 | 4.000000 | .919559 |
| POST69 | 17 | 3.176471 | 1.000000 | 5.000000 | 1.185079 |
| POST70 | 17 | 3.764706 | 2.000000 | 5.000000 | 1.091410 |
| POST71 | 17 | 1.882353 | 1.000000 | 3.000000 | .485071 |
| POST72 | 17 | 2.000000 | 1.000000 | 3.000000 | .612372 |
| POST73 | 17 | 2.588235 | 1.000000 | 5.000000 | 1.175735 |
| POST74 | 17 | 2.058824 | 1.000000 | 3.000000 | .555719 |

DESCRIPTIVE STATISTICS (continued)
PLC (continued)

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST75 | 17 | 2.647059 | 1.000000 | 5.000000 | 1.057188 |
| POST76 | 17 | 2.470588 | 1.000000 | 5.000000 | 1.067570 |
| POST77 | 17 | 2.529412 | 1.000000 | 5.000000 | 1.124591 |
| POST78 | 17 | 2.352941 | 1.000000 | 4.000000 | .996317 |
| POST79 | 17 | 1.823529 | 1.000000 | 4.000000 | .882843 |
| POST80 | 17 | 1.882353 | 1.000000 | 3.000000 | .781213 |
| POST81 | 17 | 2.235294 | 1.000000 | 3.000000 | .752447 |
| POST82 | 17 | 2.352941 | 1.000000 | 4.000000 | .931476 |
| POST83 | 17 | 1.823529 | 1.000000 | 4.000000 | .808957 |
| POST84 | 17 | 2.176471 | 1.000000 | 4.000000 | 1.131111 |
| POST85 | 17 | 1.764706 | 1.000000 | 4.000000 | .903425 |
| POST86 | 17 | 1.529412 | 1.000000 | 3.000000 | .717430 |
| POST87 | 17 | 2.117647 | 1.000000 | 5.000000 | 1.166316 |
| POST88 | 17 | 1.941176 | 1.000000 | 3.000000 | .899346 |
| POST89 | 17 | 1.352941 | 1.000000 | 3.000000 | .606339 |
| POST90 | 17 | 2.882353 | 1.000000 | 5.000000 | 1.363926 |
| POST102 | 17 | 3.529412 | 1.000000 | 4.000000 | .874475 |
| POST103 | 17 | 3.705882 | 1.000000 | 5.000000 | 1.159995 |
| POST104 | 17 | 3.000000 | 1.000000 | 5.000000 | 1.060660 |
| POST105 | 17 | 2.764706 | 1.000000 | 4.000000 | .831370 |
| POST106 | 17 | 2.411765 | 1.000000 | 4.000000 | .870260 |
| POST107 | 17 | 3.647059 | 1.000000 | 5.000000 | 1.366619 |
| POST108 | 17 | 3.000000 | 1.000000 | 5.000000 | 1.224745 |
| POST109 | 17 | 3.941176 | 1.000000 | 5.000000 | 1.248529 |
| POST110 | 17 | 3.235294 | 2.000000 | 4.000000 | .831370 |
| POST111 | 17 | 3.058824 | 1.000000 | 5.000000 | 1.248529 |
| POST112 | 17 | 2.882353 | 1.000000 | 5.000000 | 1.053705 |
| POST113 | 17 | 2.235294 | 1.000000 | 3.000000 | .562296 |
| POST114 | 17 | 2.294118 | 1.000000 | 4.000000 | .685994 |
| POST115 | 17 | 2.882353 | 1.000000 | 5.000000 | 1.111438 |
| POST116 | 17 | 3.176471 | 1.000000 | 5.000000 | 1.236694 |
| POST117 | 17 | 1.882353 | 1.000000 | 4.000000 | .857493 |
| POST118 | 17 | 1.588235 | 1.000000 | 3.000000 | .795206 |
| POST119 | 17 | 2.235294 | 1.000000 | 3.000000 | .752447 |
| POST120 | 17 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| POST121 | 16 | 2.562500 | 1.000000 | 5.000000 | 1.209339 |
| POST122 | 17 | 2.411765 | 1.000000 | 4.000000 | .795206 |
| POST123 | 16 | 2.500000 | 1.000000 | 5.000000 | 1.154701 |
| POST124 | 17 | 1.470588 | 1.000000 | 3.000000 | .624264 |
| POST125 | 17 | 2.352941 | 1.000000 | 4.000000 | .996317 |
| POST126 | 17 | 2.000000 | 1.000000 | 3.000000 | .790569 |
| POST127 | 17 | 2.000000 | 1.000000 | 4.000000 | .866025 |
| POST128 | 17 | 2.117647 | 1.000000 | 4.000000 | .857493 |
| POST129 | 17 | 1.764706 | 1.000000 | 4.000000 | .903425 |
| POST130 | 17 | 3.294118 | 1.000000 | 5.000000 | 1.159995 |
| POST131 | 17 | 1.823529 | 1.000000 | 4.000000 | .951006 |
| POST132 | 17 | 1.529412 | 1.000000 | 3.000000 | .799816 |
| POST133 | 17 | 2.352941 | 1.000000 | 4.000000 | .996317 |
| POST134 | 17 | 2.117647 | 1.000000 | 4.000000 | 1.111438 |
| POST135 | 16 | 2.500000 | 1.000000 | 5.000000 | 1.316561 |
| POST136 | 17 | 2.470588 | 1.000000 | 4.000000 | .874475 |
| POST137 | 16 | 2.437500 | 1.000000 | 4.000000 | 1.209339 |
| POST138 | 17 | 1.470588 | 1.000000 | 4.000000 | .799816 |
| POST139 | 17 | 2.411765 | 1.000000 | 3.000000 | .870260 |
| POST140 | 17 | 1.941176 | 1.000000 | 3.000000 | .899346 |
| POST141 | 17 | 2.000000 | 1.000000 | 4.000000 | .935414 |
| POST142 | 17 | 1.882353 | 1.000000 | 3.000000 | .781213 |
| POST143 | 17 | 1.764706 | 1.000000 | 3.000000 | .752447 |

DESCRIPTIVE STATISTICS (continued)
PLC Section 1 only

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| PRE1 | 9 | 1.777778 | 1.000000 | 3.000000 | .833333 |
| PRE2 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| PRE3 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| PRE4 | 9 | 1.777778 | 1.000000 | 3.000000 | .833333 |
| PRE5 | 9 | 2.333333 | 1.000000 | 3.000000 | .707107 |
| PRE6 | 9 | 2.000000 | 1.000000 | 3.000000 | .927961 |
| PRE7 | 9 | 1.888889 | 1.000000 | 3.000000 | .927961 |
| PRE8 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| PRE9 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |
| PRE10 | 9 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| PRE11 | 9 | 2.555556 | 2.000000 | 3.000000 | .527046 |
| PRE12 | 9 | 2.333333 | 2.000000 | 3.000000 | .500000 |
| PRE13 | 9 | 2.444444 | 2.000000 | 3.000000 | .527046 |
| PRE14 | 9 | 2.444444 | 2.000000 | 3.000000 | .527046 |
| PRE15 | 9 | 2.222222 | 2.000000 | 3.000000 | .440959 |
| PRE16 | 9 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| PRE17 | 9 | 1.666667 | 1.000000 | 3.000000 | .707107 |
| PRE18 | 9 | 2.111111 | 1.000000 | 3.000000 | .781736 |
| PRE19 | 9 | 1.777778 | 1.000000 | 3.000000 | .833333 |
| PRE20 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| PRE21 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |
| PRE22 | 9 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| PRE23 | 9 | 1.666667 | 1.000000 | 3.000000 | .866025 |
| PRE24 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| PRE25 | 9 | 2.111111 | 1.000000 | 3.000000 | .600925 |
| PRE26 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| PRE27 | 9 | 2.111111 | 1.000000 | 4.000000 | .927961 |
| PRE28 | 9 | 2.333333 | 1.000000 | 3.000000 | .707107 |
| PRE29 | 9 | 2.222222 | 1.000000 | 3.000000 | .833333 |
| PRE30 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| PRE31 | 9 | 2.222222 | 2.000000 | 3.000000 | .440959 |
| PRE32 | 9 | 2.222222 | 2.000000 | 3.000000 | .440959 |
| PRE33 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| PRE34 | 9 | 1.666667 | 1.000000 | 3.000000 | .707107 |
| PRE35 | 9 | 4.222222 | 3.000000 | 5.000000 | .666667 |
| PRE36 | 9 | 2.444444 | 1.000000 | 4.000000 | .881917 |
| PRE37 | 9 | 1.555556 | 1.000000 | 3.000000 | .726483 |
| PRE38 | 9 | 2.888889 | 2.000000 | 4.000000 | .600925 |
| PRE39 | 9 | 3.444444 | 3.000000 | 4.000000 | .527046 |
| PRE40 | 9 | 4.111111 | 2.000000 | 5.000000 | 1.054093 |
| PRE41 | 9 | 2.222222 | 2.000000 | 3.000000 | .440959 |
| PRE42 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| PRE43 | 9 | 2.888889 | 2.000000 | 4.000000 | .781736 |
| PRE44 | 9 | 2.222222 | 1.000000 | 4.000000 | .833333 |
| PRE45 | 9 | 2.777778 | 2.000000 | 3.000000 | .440959 |
| PRE46 | 9 | 2.555556 | 2.000000 | 4.000000 | .726483 |
| PRE47 | 9 | 2.666667 | 2.000000 | 4.000000 | .866025 |
| PRE48 | 9 | 2.222222 | 1.000000 | 3.000000 | .666667 |
| PRE49 | 9 | 2.444444 | 1.000000 | 4.000000 | .881917 |
| PRE50 | 9 | 2.333333 | 2.000000 | 4.000000 | .707107 |
| PRE51 | 9 | 1.666667 | 1.000000 | 3.000000 | .707107 |
| PRE52 | 9 | 2.333333 | 2.000000 | 3.000000 | .500000 |
| PRE53 | 9 | 1.777778 | 1.000000 | 3.000000 | .833333 |
| PRE54 | 9 | 1.555556 | 1.000000 | 3.000000 | .726483 |
| PRE55 | 9 | 2.777778 | 1.000000 | 4.000000 | .971825 |
| POST1 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |
| POST2 | 9 | 2.111111 | 1.000000 | 3.000000 | .600925 |
| POST3 | 9 | 2.111111 | 1.000000 | 3.000000 | .600925 |
| POST4 | 9 | 1.444444 | 1.000000 | 3.000000 | .726483 |
| POST5 | 9 | 2.555556 | 2.000000 | 3.000000 | .527046 |
| POST6 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |
| POST7 | 9 | 2.666667 | 1.000000 | 4.000000 | 1.000000 |
| POST8 | 9 | 2.111111 | 1.000000 | 3.000000 | .781736 |
| POST9 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |

DESCRIPTIVE STATISTICS (continued)
PLC Section 1 only (continued)

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST10 | 9 | 1.777778 | 1.000000 | 3.000000 | .833333 |
| POST11 | 9 | 2.444444 | 1.000000 | 3.000000 | .726483 |
| POST12 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |
| POST13 | 9 | 2.444444 | 2.000000 | 3.000000 | .527046 |
| POST14 | 9 | 2.555556 | 1.000000 | 4.000000 | 1.130388 |
| POST15 | 9 | 2.333333 | 2.000000 | 3.000000 | .500000 |
| POST16 | 9 | 2.333333 | 1.000000 | 4.000000 | .866025 |
| POST17 | 9 | 2.222222 | 1.000000 | 3.000000 | .833333 |
| POST18 | 9 | 2.333333 | 2.000000 | 3.000000 | .500000 |
| POST19 | 9 | 1.555556 | 1.000000 | 3.000000 | .726483 |
| POST20 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| POST21 | 9 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| POST22 | 9 | 2.222222 | 1.000000 | 4.000000 | .971825 |
| POST23 | 9 | 2.111111 | 1.000000 | 3.000000 | .781736 |
| POST24 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| POST25 | 9 | 2.444444 | 1.000000 | 3.000000 | .726483 |
| POST26 | 9 | 2.000000 | 1.000000 | 3.000000 | .500000 |
| POST27 | 9 | 2.000000 | 1.000000 | 3.000000 | .500000 |
| POST28 | 9 | 2.222222 | 1.000000 | 3.000000 | .833333 |
| POST29 | 9 | 2.666667 | 1.000000 | 4.000000 | 1.118034 |
| POST30 | 9 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| POST31 | 9 | 1.777778 | 1.000000 | 3.000000 | .833333 |
| POST32 | 9 | 2.333333 | 1.000000 | 3.000000 | .707107 |
| POST33 | 9 | 2.777778 | 1.000000 | 4.000000 | .971825 |
| POST34 | 9 | 2.555556 | 1.000000 | 3.000000 | .726483 |
| POST35 | 9 | 2.777778 | 1.000000 | 4.000000 | .971825 |
| POST36 | 9 | 2.666667 | 1.000000 | 4.000000 | .866025 |
| POST37 | 9 | 2.222222 | 1.000000 | 4.000000 | .971825 |
| POST38 | 9 | 2.666667 | 1.000000 | 4.000000 | 1.000000 |
| POST39 | 9 | 2.111111 | 1.000000 | 4.000000 | 1.054093 |
| POST40 | 9 | 3.222222 | 2.000000 | 4.000000 | .666667 |
| POST41 | 9 | 3.111111 | 1.000000 | 4.000000 | 1.054093 |
| POST42 | 9 | 2.333333 | 1.000000 | 3.000000 | .707107 |
| POST43 | 9 | 2.222222 | 1.000000 | 3.000000 | .833333 |
| POST44 | 9 | 3.222222 | 1.000000 | 4.000000 | 1.092906 |
| POST45 | 9 | 2.444444 | 1.000000 | 3.000000 | .726483 |
| POST46 | 9 | 3.111111 | 2.000000 | 4.000000 | .781736 |
| POST47 | 9 | 2.666667 | 1.000000 | 5.000000 | 1.118034 |
| POST48 | 9 | 2.777778 | 1.000000 | 5.000000 | 1.394433 |
| POST49 | 9 | 1.888889 | 1.000000 | 4.000000 | 1.054093 |
| POST50 | 9 | 2.555556 | 1.000000 | 4.000000 | 1.130388 |
| POST51 | 9 | 2.666667 | 1.000000 | 4.000000 | .866025 |
| POST52 | 9 | 2.222222 | 1.000000 | 3.000000 | .833333 |
| POST53 | 9 | 2.888889 | 2.000000 | 4.000000 | .781736 |
| POST54 | 9 | 2.555556 | 1.000000 | 3.000000 | .726483 |
| POST55 | 9 | 3.111111 | 2.000000 | 4.000000 | .600925 |
| POST56 | 9 | 2.666667 | 1.000000 | 4.000000 | .866025 |
| POST57 | 9 | 2.777778 | 2.000000 | 4.000000 | .666667 |
| POST58 | 9 | 3.000000 | 2.000000 | 4.000000 | .707107 |
| POST59 | 9 | 2.888889 | 1.000000 | 4.000000 | .927961 |
| POST60 | 9 | 2.555556 | 1.000000 | 4.000000 | .881917 |
| POST61 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |
| POST62 | 9 | 1.777778 | 1.000000 | 2.000000 | .440959 |
| POST63 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| POST64 | 9 | 1.666667 | 1.000000 | 3.000000 | .707107 |
| POST65 | 9 | 3.888889 | 1.000000 | 5.000000 | 1.269296 |
| POST66 | 9 | 2.222222 | 1.000000 | 3.000000 | .666667 |
| POST67 | 9 | 1.666667 | 1.000000 | 3.000000 | .707107 |
| POST68 | 9 | 2.444444 | 1.000000 | 3.000000 | .726483 |
| POST69 | 9 | 2.777778 | 2.000000 | 4.000000 | .833333 |
| POST70 | 9 | 3.555556 | 2.000000 | 5.000000 | 1.333333 |
| POST71 | 9 | 2.111111 | 2.000000 | 3.000000 | .333333 |
| POST72 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| POST73 | 9 | 2.888889 | 2.000000 | 5.000000 | 1.166667 |
| POST74 | 9 | 2.111111 | 1.000000 | 3.000000 | .600925 |

DESCRIPTIVE STATISTICS (continued)
PLC Section 1 only (continued)

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST75 | 9 | 2.333333 | 1.000000 | 3.000000 | .707107 |
| POST76 | 9 | 2.666667 | 1.000000 | 5.000000 | 1.322876 |
| POST77 | 9 | 3.000000 | 1.000000 | 5.000000 | 1.224745 |
| POST78 | 9 | 2.333333 | 1.000000 | 4.000000 | 1.118034 |
| POST79 | 9 | 2.111111 | 1.000000 | 4.000000 | .927961 |
| POST80 | 9 | 1.888889 | 1.000000 | 3.000000 | .781736 |
| POST81 | 9 | 2.333333 | 1.000000 | 3.000000 | .707107 |
| POST82 | 9 | 2.666667 | 1.000000 | 4.000000 | 1.000000 |
| POST83 | 9 | 1.888889 | 1.000000 | 3.000000 | .600925 |
| POST84 | 9 | 2.666667 | 1.000000 | 4.000000 | .866025 |
| POST85 | 9 | 2.000000 | 1.000000 | 3.000000 | .707107 |
| POST86 | 9 | 1.666667 | 1.000000 | 3.000000 | .866025 |
| POST87 | 9 | 2.222222 | 1.000000 | 5.000000 | 1.394433 |
| POST88 | 9 | 2.000000 | 1.000000 | 3.000000 | 1.000000 |
| POST89 | 9 | 1.555556 | 1.000000 | 3.000000 | .726483 |
| POST90 | 9 | 2.888889 | 1.000000 | 5.000000 | 1.364225 |
| POST102 | 9 | 3.555556 | 2.000000 | 4.000000 | .726483 |
| POST103 | 9 | 3.888889 | 2.000000 | 5.000000 | 1.054093 |
| POST104 | 9 | 3.000000 | 2.000000 | 4.000000 | .707107 |
| POST105 | 9 | 3.000000 | 2.000000 | 4.000000 | .707107 |
| POST106 | 9 | 2.777778 | 2.000000 | 4.000000 | .833333 |
| POST107 | 9 | 3.777778 | 2.000000 | 5.000000 | 1.394433 |
| POST108 | 9 | 3.111111 | 2.000000 | 5.000000 | 1.166667 |
| POST109 | 9 | 4.444444 | 4.000000 | 5.000000 | .527046 |
| POST110 | 9 | 3.333333 | 2.000000 | 4.000000 | .866025 |
| POST111 | 9 | 2.888889 | 2.000000 | 5.000000 | 1.166667 |
| POST112 | 9 | 3.333333 | 2.000000 | 5.000000 | 1.000000 |
| POST113 | 9 | 2.222222 | 2.000000 | 3.000000 | .440959 |
| POST114 | 9 | 2.333333 | 2.000000 | 4.000000 | .707107 |
| POST115 | 9 | 2.666667 | 2.000000 | 4.000000 | .707107 |
| POST116 | 9 | 3.333333 | 1.000000 | 5.000000 | 1.224745 |
| POST117 | 9 | 2.222222 | 1.000000 | 4.000000 | .833333 |
| POST118 | 9 | 1.888889 | 1.000000 | 3.000000 | .927961 |
| POST119 | 9 | 2.333333 | 1.000000 | 3.000000 | .866025 |
| POST120 | 9 | 2.111111 | 1.000000 | 3.000000 | .927961 |
| POST121 | 9 | 2.666667 | 2.000000 | 5.000000 | 1.118034 |
| POST122 | 9 | 2.555556 | 2.000000 | 3.000000 | .527046 |
| POST123 | 9 | 2.555556 | 1.000000 | 4.000000 | .881917 |
| POST124 | 9 | 1.666667 | 1.000000 | 3.000000 | .707107 |
| POST125 | 9 | 2.777778 | 1.000000 | 4.000000 | .971825 |
| POST126 | 9 | 2.444444 | 1.000000 | 3.000000 | .726483 |
| POST127 | 9 | 2.333333 | 1.000000 | 4.000000 | .866025 |
| POST128 | 9 | 2.555556 | 2.000000 | 4.000000 | .726483 |
| POST129 | 9 | 2.000000 | 1.000000 | 4.000000 | 1.000000 |
| POST130 | 9 | 3.444444 | 2.000000 | 5.000000 | .881917 |
| POST131 | 9 | 2.111111 | 1.000000 | 4.000000 | 1.054093 |
| POST132 | 9 | 1.777778 | 1.000000 | 3.000000 | .971825 |
| POST133 | 9 | 2.444444 | 1.000000 | 4.000000 | 1.013794 |
| POST134 | 9 | 2.444444 | 1.000000 | 4.000000 | 1.130388 |
| POST135 | 9 | 2.555556 | 1.000000 | 5.000000 | 1.589899 |
| POST136 | 9 | 2.444444 | 1.000000 | 4.000000 | .881917 |
| POST137 | 9 | 2.444444 | 1.000000 | 4.000000 | 1.130388 |
| POST138 | 9 | 1.444444 | 1.000000 | 4.000000 | 1.013794 |
| POST139 | 9 | 2.777778 | 1.000000 | 3.000000 | .666667 |
| POST140 | 9 | 2.111111 | 1.000000 | 3.000000 | .927961 |
| POST141 | 9 | 2.111111 | 1.000000 | 4.000000 | 1.054093 |
| POST142 | 9 | 2.000000 | 1.000000 | 3.000000 | .866025 |
| POST143 | 9 | 1.777778 | 1.000000 | 3.000000 | .666667 |

DESCRIPTIVE STATISTICS (continued)
PLC Section 2 only

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| PRE1 | 8 | 1.50000 | 1.00000 | 2.00000 | .534522 |
| PRE2 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE3 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE4 | 8 | 1.25000 | 1.00000 | 2.00000 | .462910 |
| PRE5 | 8 | 2.00000 | 1.00000 | 3.00000 | .755929 |
| PRE6 | 8 | 1.62500 | 1.00000 | 3.00000 | .744024 |
| PRE7 | 8 | 1.25000 | 1.00000 | 2.00000 | .462910 |
| PRE8 | 8 | 1.50000 | 1.00000 | 3.00000 | .755929 |
| PRE9 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE10 | 8 | 1.75000 | 1.00000 | 3.00000 | .707107 |
| PRE11 | 8 | 1.75000 | 1.00000 | 3.00000 | .707107 |
| PRE12 | 8 | 1.50000 | 1.00000 | 3.00000 | .755929 |
| PRE13 | 8 | 1.62500 | 1.00000 | 4.00000 | 1.060660 |
| PRE14 | 8 | 1.87500 | 1.00000 | 3.00000 | .640870 |
| PRE15 | 8 | 1.75000 | 1.00000 | 4.00000 | 1.035098 |
| PRE16 | 8 | 2.25000 | 1.00000 | 3.00000 | .886405 |
| PRE17 | 8 | 1.75000 | 1.00000 | 3.00000 | .707107 |
| PRE18 | 8 | 2.37500 | 1.00000 | 3.00000 | .916125 |
| PRE19 | 8 | 1.12500 | 1.00000 | 2.00000 | .353553 |
| PRE20 | 8 | 1.25000 | 1.00000 | 2.00000 | .462910 |
| PRE21 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE22 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE23 | 8 | 1.12500 | 1.00000 | 2.00000 | .353553 |
| PRE24 | 8 | 1.00000 | 1.00000 | 1.00000 | 0.000000 |
| PRE25 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE26 | 8 | 1.62500 | 1.00000 | 4.00000 | 1.060660 |
| PRE27 | 8 | 1.50000 | 1.00000 | 3.00000 | .925820 |
| PRE28 | 8 | 1.75000 | 1.00000 | 3.00000 | .707107 |
| PRE29 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE30 | 8 | 1.37500 | 1.00000 | 3.00000 | .744024 |
| PRE31 | 8 | 2.00000 | 1.00000 | 3.00000 | .534522 |
| PRE32 | 8 | 2.00000 | 1.00000 | 3.00000 | .755929 |
| PRE33 | 8 | 1.25000 | 1.00000 | 2.00000 | .462910 |
| PRE34 | 8 | 1.12500 | 1.00000 | 2.00000 | .353553 |
| PRE35 | 8 | 3.62500 | 1.00000 | 5.00000 | 1.767767 |
| PRE36 | 8 | 1.62500 | 1.00000 | 3.00000 | .744024 |
| PRE37 | 8 | 1.12500 | 1.00000 | 2.00000 | .353553 |
| PRE38 | 8 | 2.37500 | 1.00000 | 5.00000 | 1.505941 |
| PRE39 | 8 | 3.50000 | 1.00000 | 5.00000 | 1.195229 |
| PRE40 | 8 | 3.25000 | 1.00000 | 5.00000 | 1.908627 |
| PRE41 | 8 | 1.37500 | 1.00000 | 2.00000 | .517549 |
| PRE42 | 8 | 1.62500 | 1.00000 | 3.00000 | .744024 |
| PRE43 | 8 | 2.00000 | 1.00000 | 3.00000 | .925820 |
| PRE44 | 8 | 1.50000 | 1.00000 | 3.00000 | .755929 |
| PRE45 | 8 | 2.37500 | 1.00000 | 4.00000 | 1.060660 |
| PRE46 | 8 | 2.50000 | 1.00000 | 4.00000 | 1.195229 |
| PRE47 | 8 | 2.37500 | 1.00000 | 4.00000 | 1.302470 |
| PRE48 | 8 | 1.37500 | 1.00000 | 3.00000 | .744024 |
| PRE49 | 8 | 1.75000 | 1.00000 | 5.00000 | 1.488048 |
| PRE50 | 8 | 1.50000 | 1.00000 | 4.00000 | 1.069045 |
| PRE51 | 8 | 1.25000 | 1.00000 | 2.00000 | .462910 |
| PRE52 | 8 | 2.25000 | 1.00000 | 4.00000 | .886405 |
| PRE53 | 8 | 1.25000 | 1.00000 | 2.00000 | .462910 |
| PRE54 | 8 | 1.50000 | 1.00000 | 2.00000 | .534522 |
| PRE55 | 8 | 2.87500 | 1.00000 | 5.00000 | 1.356203 |
| POST1 | 8 | 1.125000 | 1.000000 | 2.000000 | .353553 |
| POST2 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST3 | 8 | 1.250000 | 1.000000 | 2.000000 | .462910 |
| POST4 | 8 | 1.000000 | 1.000000 | 1.000000 | 0.000000 |
| POST5 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST6 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST7 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST8 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST9 | 8 | 1.000000 | 1.000000 | 1.000000 | 0.000000 |

DESCRIPTIVE STATISTICS (continued)
PLC Section 2 only (continued)

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST10 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST11 | 8 | 2.250000 | 1.000000 | 3.000000 | .886405 |
| POST12 | 8 | 2.250000 | 1.000000 | 4.000000 | 1.035098 |
| POST13 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST14 | 8 | 1.750000 | 1.000000 | 3.000000 | .886405 |
| POST15 | 8 | 2.000000 | 1.000000 | 4.000000 | .925820 |
| POST16 | 7 | 2.857143 | 1.000000 | 4.000000 | .899735 |
| POST17 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST18 | 8 | 2.750000 | 1.000000 | 4.000000 | 1.035098 |
| POST19 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST20 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST21 | 8 | 1.750000 | 1.000000 | 3.000000 | .886405 |
| POST22 | 8 | 1.375000 | 1.000000 | 3.000000 | .744024 |
| POST23 | 8 | 1.750000 | 1.000000 | 4.000000 | 1.035098 |
| POST24 | 8 | .500000 | 1.000000 | 3.000000 | .755929 |
| POST25 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST26 | 8 | 1.875000 | 1.000000 | 4.000000 | .991031 |
| POST27 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST28 | 8 | 2.125000 | 1.000000 | 4.000000 | 1.125992 |
| POST29 | 8 | 1.750000 | 1.000000 | 3.000000 | 1.035098 |
| POST30 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST31 | 8 | 1.625000 | 1.000000 | 2.000000 | .517549 |
| POST32 | 8 | 2.250000 | 1.000000 | 4.000000 | .886405 |
| POST33 | 8 | 2.250000 | 1.000000 | 3.000000 | .707107 |
| POST34 | 8 | 2.000000 | 1.000000 | 3.000000 | .755929 |
| POST35 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST36 | 8 | 2.125000 | 1.000000 | 4.000000 | .991031 |
| POST37 | 8 | 1.375000 | 1.000000 | 2.000000 | .517549 |
| POST38 | 8 | 1.750000 | 1.000000 | 3.000000 | .707107 |
| POST39 | 8 | 1.750000 | 1.000000 | 2.000000 | .462910 |
| POST40 | 8 | 1.500000 | 1.000000 | 2.000000 | .534522 |
| POST41 | 8 | 2.375000 | 1.000000 | 3.000000 | .744024 |
| POST42 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST43 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST44 | 8 | 2.750000 | 2.000000 | 4.000000 | .707107 |
| POST45 | 8 | 2.000000 | 1.000000 | 3.000000 | .755929 |
| POST46 | 8 | 2.125000 | 1.000000 | 3.000000 | .834523 |
| POST47 | 8 | 2.625000 | 1.000000 | 5.000000 | 1.187735 |
| POST48 | 8 | 2.125000 | 1.000000 | 4.000000 | .991031 |
| POST49 | 8 | 2.000000 | 1.000000 | 3.000000 | .534522 |
| POST50 | 8 | 2.125000 | 1.000000 | 3.000000 | .834523 |
| POST51 | 8 | 1.875000 | 1.000000 | 4.000000 | 1.125992 |
| POST52 | 8 | 1.875000 | 1.000000 | 4.000000 | 1.125992 |
| POST53 | 8 | 2.500000 | 1.000000 | 3.000000 | .755929 |
| POST54 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST55 | 8 | 2.000000 | 1.000000 | 3.000000 | .755929 |
| POST56 | 8 | 2.125000 | 1.000000 | 4.000000 | .991031 |
| POST57 | 8 | 1.750000 | 1.000000 | 4.000000 | 1.035098 |
| POST58 | 8 | 2.125000 | 1.000000 | 4.000000 | 1.125992 |
| POST59 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST60 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST61 | 8 | 1.875000 | 1.000000 | 3.000000 | .640870 |
| POST62 | 8 | 2.125000 | 1.000000 | 3.000000 | .640870 |
| POST63 | 8 | 1.875000 | 1.000000 | 3.000000 | .640870 |
| POST64 | 8 | 1.250000 | 1.000000 | 2.000000 | .462910 |
| POST65 | 8 | 4.250000 | 3.000000 | 5.000000 | .707107 |
| POST66 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST67 | 8 | 1.250000 | 1.000000 | 2.000000 | .462910 |
| POST68 | 8 | 2.125000 | 1.000000 | 4.000000 | 1.125992 |
| POST69 | 8 | 3.625000 | 1.000000 | 5.000000 | 1.407886 |
| POST70 | 8 | 4.000000 | 3.000000 | 5.000000 | .755929 |
| POST71 | 8 | 1.625000 | 1.000000 | 2.000000 | .517549 |
| POST72 | 8 | 2.000000 | 1.000000 | 3.000000 | .534522 |
| POST73 | 8 | 2.250000 | 1.000000 | 4.000000 | 1.164965 |
| POST74 | 8 | 2.000000 | 1.000000 | 3.000000 | .534522 |

DESCRIPTIVE STATISTICS (continued)
PLC Section 2 only (continued)

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST75 | 8 | 3.000000 | 1.000000 | 5.000000 | 1.309307 |
| POST76 | 8 | 2.250000 | 1.000000 | 3.000000 | .707107 |
| POST77 | 8 | 2.000000 | 1.000000 | 3.000000 | .755929 |
| POST78 | 8 | 2.375000 | 1.000000 | 4.000000 | .916125 |
| POST79 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST80 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST81 | 8 | 2.125000 | 1.000000 | 3.000000 | .834523 |
| POST82 | 8 | 2.000000 | 1.000000 | 3.000000 | .755929 |
| POST83 | 8 | 1.750000 | 1.000000 | 4.000000 | 1.035098 |
| POST84 | 8 | 1.625000 | 1.000000 | 4.000000 | 1.187735 |
| POST85 | 8 | 1.500000 | 1.000000 | 4.000000 | 1.069045 |
| POST86 | 8 | 1.375000 | 1.000000 | 2.000000 | .517549 |
| POST87 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST88 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST89 | 8 | 1.125000 | 1.000000 | 2.000000 | .353553 |
| POST90 | 8 | 2.875000 | 1.000000 | 5.000000 | 1.457738 |
| POST102 | 8 | 3.500000 | 1.000000 | 4.000000 | 1.069045 |
| POST103 | 8 | 3.500000 | 1.000000 | 5.000000 | 1.309307 |
| POST104 | 8 | 3.000000 | 1.000000 | 5.000000 | 1.414214 |
| POST105 | 8 | 2.500000 | 1.000000 | 4.000000 | .925820 |
| POST106 | 8 | 2.000000 | 1.000000 | 3.000000 | .755929 |
| POST107 | 8 | 3.500000 | 1.000000 | 5.000000 | 1.414214 |
| POST108 | 8 | 2.875000 | 1.000000 | 5.000000 | 1.356203 |
| POST109 | 8 | 3.375000 | 1.000000 | 5.000000 | 1.597990 |
| POST110 | 8 | 3.125000 | 2.000000 | 4.000000 | .834523 |
| POST111 | 8 | 3.250000 | 1.000000 | 5.000000 | 1.388730 |
| POST112 | 8 | 2.375000 | 1.000000 | 4.000000 | .916125 |
| POST113 | 8 | 2.250000 | 1.000000 | 3.000000 | .707107 |
| POST114 | 8 | 2.250000 | 1.000000 | 3.000000 | .707107 |
| POST115 | 8 | 3.125000 | 1.000000 | 5.000000 | 1.457738 |
| POST116 | 8 | 3.000000 | 1.000000 | 5.000000 | 1.309307 |
| POST117 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST118 | 8 | 1.250000 | 1.000000 | 2.000000 | .462910 |
| POST119 | 8 | 2.125000 | 1.000000 | 3.000000 | .640870 |
| POST120 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST121 | 7 | 2.428571 | 1.000000 | 5.000000 | 1.397276 |
| POST122 | 8 | 2.250000 | 1.000000 | 4.000000 | 1.035098 |
| POST123 | 7 | 2.428571 | 1.000000 | 5.000000 | 1.511858 |
| POST124 | 8 | 1.250000 | 1.000000 | 2.000000 | .462910 |
| POST125 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST126 | 8 | 1.500000 | 1.000000 | 2.000000 | .534522 |
| POST127 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST128 | 8 | 1.625000 | 1.000000 | 3.000000 | .744024 |
| POST129 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST130 | 8 | 3.125000 | 1.000000 | 5.000000 | 1.457738 |
| POST131 | 8 | 1.500000 | 1.000000 | 3.000000 | .755929 |
| POST132 | 8 | 1.250000 | 1.000000 | 2.000000 | .462910 |
| POST133 | 8 | 2.250000 | 1.000000 | 4.000000 | 1.035098 |
| POST134 | 8 | 1.750000 | 1.000000 | 4.000000 | 1.035098 |
| POST135 | 7 | 2.428571 | 1.000000 | 4.000000 | .975900 |
| POST136 | 8 | 2.500000 | 1.000000 | 4.000000 | .925820 |
| POST137 | 7 | 2.428571 | 1.000000 | 4.000000 | 1.397276 |
| POST138 | 8 | 1.500000 | 1.000000 | 2.000000 | .534522 |
| POST139 | 8 | 2.000000 | 1.000000 | 3.000000 | .925820 |
| POST140 | 8 | 1.750000 | 1.000000 | 3.000000 | .886405 |
| POST141 | 8 | 1.875000 | 1.000000 | 3.000000 | .834523 |
| POST142 | 8 | 1.750000 | 1.000000 | 3.000000 | .707107 |
| POST143 | 8 | 1.750000 | 1.000000 | 3.000000 | .886405 |

DESCRIPTIVE STATISTICS (continued)**Control**

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| PRE1 | 14 | 1.78571 | 1.00000 | 3.00000 | .578934 |
| PRE2 | 14 | 2.14286 | 1.00000 | 4.00000 | .949262 |
| PRE3 | 14 | 1.92857 | 1.00000 | 3.00000 | .615728 |
| PRE4 | 14 | 1.50000 | 1.00000 | 2.00000 | .518875 |
| PRE5 | 14 | 2.28571 | 1.00000 | 4.00000 | .726273 |
| PRE6 | 14 | 2.14286 | 1.00000 | 3.00000 | .534522 |
| PRE7 | 14 | 2.35714 | 1.00000 | 4.00000 | .841897 |
| PRE8 | 14 | 2.35714 | 1.00000 | 4.00000 | .744946 |
| PRE9 | 14 | 1.92857 | 1.00000 | 3.00000 | .615728 |
| PRE10 | 14 | 2.21429 | 1.00000 | 4.00000 | .801784 |
| PRE11 | 14 | 2.71429 | 1.00000 | 4.00000 | .825420 |
| PRE12 | 14 | 2.50000 | 1.00000 | 4.00000 | 1.091928 |
| PRE13 | 14 | 2.78571 | 1.00000 | 5.00000 | .974961 |
| PRE14 | 14 | 2.50000 | 1.00000 | 4.00000 | .854850 |
| PRE15 | 14 | 2.28571 | 1.00000 | 4.00000 | .913874 |
| PRE16 | 14 | 2.35714 | 1.00000 | 4.00000 | .841897 |
| PRE17 | 14 | 2.42857 | 1.00000 | 4.00000 | .851631 |
| PRE18 | 14 | 2.64286 | 2.00000 | 3.00000 | .497245 |
| PRE19 | 14 | 1.57143 | 1.00000 | 2.00000 | .513553 |
| PRE20 | 14 | 1.92857 | 1.00000 | 3.00000 | .730046 |
| PRE21 | 14 | 2.00000 | 1.00000 | 3.00000 | .784465 |
| PRE22 | 14 | 2.07143 | 1.00000 | 3.00000 | .828742 |
| PRE23 | 14 | 1.78571 | 1.00000 | 3.00000 | .892582 |
| PRE24 | 14 | 1.85714 | 1.00000 | 3.00000 | .662994 |
| PRE25 | 14 | 2.50000 | 2.00000 | 4.00000 | .650444 |
| PRE26 | 14 | 2.14286 | 1.00000 | 3.00000 | .534522 |
| PRE27 | 14 | 2.21429 | 1.00000 | 4.00000 | .699293 |
| PRE28 | 14 | 2.78571 | 2.00000 | 4.00000 | .578934 |
| PRE29 | 14 | 2.00000 | 1.00000 | 3.00000 | .784465 |
| PRE30 | 14 | 2.00000 | 1.00000 | 3.00000 | .877058 |
| PRE31 | 14 | 2.64286 | 2.00000 | 5.00000 | .841897 |
| PRE32 | 14 | 2.28571 | 1.00000 | 3.00000 | .611250 |
| PRE33 | 14 | 2.21429 | 1.00000 | 4.00000 | .699293 |
| PRE34 | 14 | 2.07143 | 1.00000 | 3.00000 | .615728 |
| PRE35 | 14 | 3.57143 | 2.00000 | 4.00000 | .646206 |
| PRE36 | 14 | 2.35714 | 1.00000 | 4.00000 | .928783 |
| PRE37 | 14 | 1.28571 | 1.00000 | 2.00000 | .468807 |
| PRE38 | 14 | 2.78571 | 2.00000 | 4.00000 | .699293 |
| PRE39 | 14 | 3.42857 | 3.00000 | 5.00000 | .646206 |
| PRE40 | 14 | 3.50000 | 1.00000 | 5.00000 | 1.160239 |
| PRE41 | 14 | 2.14286 | 2.00000 | 3.00000 | .363137 |
| PRE42 | 13 | 2.76923 | 2.00000 | 4.00000 | .599145 |
| PRE43 | 14 | 3.07143 | 2.00000 | 4.00000 | .730046 |
| PRE44 | 14 | 2.00000 | 1.00000 | 3.00000 | .392232 |
| PRE45 | 14 | 2.85714 | 2.00000 | 4.00000 | .770329 |
| PRE46 | 14 | 2.57143 | 2.00000 | 4.00000 | .755929 |
| PRE47 | 13 | 2.69231 | 2.00000 | 4.00000 | .630425 |
| PRE48 | 14 | 2.07143 | 1.00000 | 3.00000 | .474631 |
| PRE49 | 14 | 2.14286 | 1.00000 | 4.00000 | .770329 |
| PRE50 | 14 | 2.14286 | 1.00000 | 4.00000 | .770329 |
| PRE51 | 14 | 1.28571 | 1.00000 | 2.00000 | .468807 |
| PRE52 | 14 | 2.07143 | 1.00000 | 3.00000 | .730046 |
| PRE53 | 14 | 1.71429 | 1.00000 | 3.00000 | .726273 |
| PRE54 | 14 | 1.71429 | 1.00000 | 4.00000 | .913874 |
| PRE55 | 14 | 2.92857 | 2.00000 | 4.00000 | .828742 |
| POST1 | 14 | 1.928571 | 1.000000 | 3.000000 | .730046 |
| POST2 | 13 | 2.307692 | 1.000000 | 4.000000 | .947331 |
| POST3 | 14 | 2.071429 | 1.000000 | 3.000000 | .730046 |
| POST4 | 14 | 1.428571 | 1.000000 | 2.000000 | .513553 |
| POST5 | 14 | 2.357143 | 1.000000 | 4.000000 | .928783 |
| POST6 | 14 | 2.071429 | 1.000000 | 3.000000 | .916875 |
| POST7 | 14 | 2.142857 | 1.000000 | 4.000000 | .949262 |
| POST8 | 14 | 2.571429 | 1.000000 | 5.000000 | .937614 |
| POST9 | 14 | 2.000000 | 1.000000 | 3.000000 | .554700 |

DESCRIPTIVE STATISTICS (continued)**Control (continued)**

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST10 | 14 | 2.071429 | 1.000000 | 4.000000 | .730046 |
| POST11 | 14 | 2.571429 | 1.000000 | 3.000000 | .646206 |
| POST12 | 14 | 2.428571 | 1.000000 | 4.000000 | .937614 |
| POST13 | 14 | 3.071429 | 2.000000 | 5.000000 | .997249 |
| POST14 | 14 | 2.642857 | 2.000000 | 4.000000 | .633324 |
| POST15 | 14 | 2.357143 | 1.000000 | 3.000000 | .633324 |
| POST16 | 14 | 2.642857 | 1.000000 | 4.000000 | 1.008208 |
| POST17 | 14 | 2.785714 | 1.000000 | 4.000000 | .974961 |
| POST18 | 14 | 2.785714 | 2.000000 | 4.000000 | .801784 |
| POST19 | 14 | 1.928571 | 1.000000 | 4.000000 | .916875 |
| POST20 | 14 | 2.071429 | 1.000000 | 4.000000 | .916875 |
| POST21 | 14 | 2.000000 | 1.000000 | 4.000000 | .784465 |
| POST22 | 14 | 1.714286 | 1.000000 | 3.000000 | .825420 |
| POST23 | 14 | 1.857143 | 1.000000 | 4.000000 | 1.027105 |
| POST24 | 14 | 1.714286 | 1.000000 | 3.000000 | .726273 |
| POST25 | 14 | 1.857143 | 1.000000 | 4.000000 | .949262 |
| POST26 | 14 | 2.071429 | 1.000000 | 4.000000 | .997249 |
| POST27 | 14 | 1.857143 | 1.000000 | 3.000000 | .770329 |
| POST28 | 14 | 2.142857 | 1.000000 | 4.000000 | .864438 |
| POST29 | 14 | 1.714286 | 1.000000 | 3.000000 | .611250 |
| POST30 | 14 | 1.642857 | 1.000000 | 3.000000 | .633324 |
| POST31 | 14 | 2.642857 | 1.000000 | 3.000000 | .633324 |
| POST32 | 14 | 2.714286 | 1.000000 | 4.000000 | .825420 |
| POST33 | 14 | 2.642857 | 1.000000 | 4.000000 | .841897 |
| POST34 | 14 | 2.928571 | 2.000000 | 4.000000 | .474631 |
| POST35 | 14 | 3.071429 | 2.000000 | 4.000000 | .615728 |
| POST36 | 14 | 2.714286 | 1.000000 | 3.000000 | .726273 |
| POST37 | 14 | 3.571429 | 3.000000 | 5.000000 | .755929 |
| POST38 | 14 | 3.285714 | 1.000000 | 5.000000 | 1.325987 |
| POST39 | 14 | 2.785714 | 1.000000 | 4.000000 | .801784 |
| POST40 | 14 | 3.000000 | 2.000000 | 5.000000 | .960769 |
| POST41 | 14 | 3.357143 | 2.000000 | 5.000000 | 1.008208 |
| POST42 | 14 | 3.571429 | 2.000000 | 5.000000 | 1.016350 |
| POST43 | 14 | 3.928571 | 3.000000 | 5.000000 | .916875 |
| POST44 | 14 | 3.714286 | 2.000000 | 5.000000 | 1.069045 |
| POST45 | 14 | 3.571429 | 3.000000 | 5.000000 | .646206 |
| POST46 | 14 | 2.642857 | 1.000000 | 5.000000 | 1.150728 |
| POST47 | 14 | 3.857143 | 3.000000 | 4.000000 | .363137 |
| POST48 | 14 | 3.000000 | 1.000000 | 5.000000 | 1.240347 |
| POST49 | 14 | 2.285714 | 1.000000 | 5.000000 | 1.204388 |
| POST50 | 14 | 2.428571 | 1.000000 | 4.000000 | .851631 |
| POST51 | 14 | 2.571429 | 1.000000 | 3.000000 | .646206 |
| POST52 | 14 | 1.928571 | 1.000000 | 3.000000 | .730046 |
| POST53 | 14 | 2.500000 | 1.000000 | 4.000000 | .940540 |
| POST54 | 14 | 2.357143 | 1.000000 | 3.000000 | .744946 |
| POST55 | 14 | 2.357143 | 1.000000 | 3.000000 | .744946 |
| POST56 | 14 | 2.642857 | 1.000000 | 4.000000 | 1.008208 |
| POST57 | 14 | 2.642857 | 1.000000 | 4.000000 | .928783 |
| POST58 | 14 | 2.785714 | 1.000000 | 4.000000 | .801784 |
| POST59 | 14 | 2.428571 | 1.000000 | 4.000000 | 1.016350 |
| POST60 | 14 | 2.285714 | 1.000000 | 4.000000 | .913874 |
| POST61 | 14 | 2.857143 | 2.000000 | 4.000000 | .864438 |
| POST62 | 14 | 2.857143 | 2.000000 | 4.000000 | .864438 |
| POST63 | 14 | 2.428571 | 1.000000 | 4.000000 | .937614 |
| POST64 | 14 | 1.928571 | 1.000000 | 4.000000 | .916875 |
| POST65 | 14 | 3.500000 | 2.000000 | 4.000000 | .759555 |
| POST66 | 14 | 2.571429 | 2.000000 | 4.000000 | .755929 |
| POST67 | 14 | 1.500000 | 1.000000 | 3.000000 | .650444 |
| POST68 | 14 | 2.857143 | 1.000000 | 5.000000 | .949262 |
| POST69 | 14 | 3.071429 | 2.000000 | 4.000000 | .828742 |
| POST70 | 14 | 3.142857 | 1.000000 | 5.000000 | 1.099450 |
| POST71 | 14 | 2.285714 | 1.000000 | 4.000000 | .726273 |
| POST72 | 14 | 2.500000 | 2.000000 | 4.000000 | .650444 |
| POST73 | 14 | 3.214286 | 2.000000 | 5.000000 | .892582 |
| POST74 | 14 | 1.928571 | 1.000000 | 2.000000 | .267261 |

DESCRIPTIVE STATISTICS (continued)**Control (continued)**

| <u>Item</u> | <u>Valid n</u> | <u>M</u> | <u>minimum</u> | <u>maximum</u> | <u>Std. Dev.</u> |
|-------------|----------------|----------|----------------|----------------|------------------|
| POST75 | 14 | 2.571429 | 1.000000 | 4.000000 | 1.089410 |
| POST76 | 14 | 3.285714 | 1.000000 | 5.000000 | 1.138729 |
| POST77 | 14 | 3.500000 | 1.000000 | 5.000000 | 1.224745 |
| POST78 | 14 | 2.214286 | 1.000000 | 4.000000 | .699293 |
| POST79 | 14 | 1.714286 | 1.000000 | 2.000000 | .468807 |
| POST80 | 14 | 2.071429 | 1.000000 | 3.000000 | .474631 |
| POST81 | 14 | 2.428571 | 2.000000 | 3.000000 | .513553 |
| POST82 | 14 | 2.357143 | 2.000000 | 3.000000 | .497245 |
| POST83 | 14 | 1.785714 | 1.000000 | 3.000000 | .578934 |
| POST84 | 14 | 2.000000 | 1.000000 | 3.000000 | .679366 |
| POST85 | 14 | 1.857143 | 1.000000 | 3.000000 | .662994 |
| POST86 | 14 | 1.500000 | 1.000000 | 3.000000 | .650444 |
| POST87 | 14 | 2.285714 | 1.000000 | 3.000000 | .825420 |
| POST88 | 14 | 2.142857 | 1.000000 | 3.000000 | .770329 |
| POST89 | 14 | 1.500000 | 1.000000 | 2.000000 | .518875 |
| POST90 | 14 | 2.357143 | 1.000000 | 4.000000 | .744946 |
| POST102 | 14 | 3.785714 | 3.000000 | 4.000000 | .425815 |
| POST103 | 14 | 3.428571 | 2.000000 | 4.000000 | .646206 |
| POST104 | 14 | 4.000000 | 3.000000 | 5.000000 | .392232 |
| POST105 | 14 | 4.428571 | 3.000000 | 5.000000 | .646206 |
| POST106 | 14 | 4.142857 | 3.000000 | 5.000000 | .534522 |
| POST107 | 14 | 4.214286 | 3.000000 | 5.000000 | .699293 |
| POST108 | 14 | 4.642857 | 3.000000 | 5.000000 | .633324 |
| POST109 | 14 | 4.071429 | 3.000000 | 5.000000 | .828742 |
| POST110 | 14 | 4.071429 | 3.000000 | 5.000000 | .730046 |
| POST111 | 14 | 2.214286 | 1.000000 | 4.000000 | .801784 |
| POST112 | 14 | 2.857143 | 2.000000 | 4.000000 | .662994 |
| POST113 | 14 | 3.214286 | 2.000000 | 4.000000 | .699293 |
| POST114 | 14 | 3.142857 | 2.000000 | 5.000000 | .770329 |
| POST115 | 14 | 3.428571 | 2.000000 | 5.000000 | 1.016350 |
| POST116 | 14 | 2.928571 | 2.000000 | 4.000000 | .730046 |
| POST117 | 14 | 1.785714 | 1.000000 | 3.000000 | .801784 |
| POST118 | 14 | 2.000000 | 1.000000 | 3.000000 | .784465 |
| POST119 | 14 | 3.214286 | 2.000000 | 4.000000 | .699293 |
| POST120 | 14 | 3.142857 | 2.000000 | 4.000000 | .662994 |
| POST121 | 14 | 3.357143 | 2.000000 | 5.000000 | .928783 |
| POST122 | 14 | 3.714286 | 2.000000 | 5.000000 | .913874 |
| POST123 | 14 | 2.500000 | 1.000000 | 4.000000 | 1.091928 |
| POST124 | 14 | 2.071429 | 1.000000 | 4.000000 | .916875 |
| POST125 | 14 | 1.857143 | 1.000000 | 3.000000 | .864438 |
| POST126 | 14 | 2.285714 | 1.000000 | 3.000000 | .726273 |
| POST127 | 14 | 2.714286 | 1.000000 | 5.000000 | 1.138729 |
| POST128 | 14 | 2.285714 | 1.000000 | 5.000000 | 1.325987 |
| POST129 | 14 | 2.285714 | 1.000000 | 5.000000 | 1.138729 |
| POST130 | 14 | 3.285714 | 2.000000 | 4.000000 | .611250 |
| POST131 | 14 | 2.071429 | 1.000000 | 3.000000 | .730046 |
| POST132 | 14 | 2.357143 | 1.000000 | 4.000000 | .928783 |
| POST133 | 14 | 3.357143 | 2.000000 | 4.000000 | .633324 |
| POST134 | 14 | 3.285714 | 2.000000 | 4.000000 | .726273 |
| POST135 | 14 | 3.214286 | 2.000000 | 4.000000 | .699293 |
| POST136 | 14 | 3.500000 | 3.000000 | 4.000000 | .518875 |
| POST137 | 14 | 2.428571 | 1.000000 | 4.000000 | 1.157868 |
| POST138 | 14 | 2.000000 | 1.000000 | 4.000000 | .960769 |
| POST139 | 14 | 2.142857 | 1.000000 | 3.000000 | .770329 |
| POST140 | 14 | 2.357143 | 1.000000 | 3.000000 | .633324 |
| POST141 | 14 | 2.571429 | 1.000000 | 4.000000 | .851631 |
| POST142 | 14 | 2.285714 | 1.000000 | 4.000000 | .825420 |
| POST143 | 14 | 2.357143 | 1.000000 | 5.000000 | 1.150728 |