

# **A Study of the Effectiveness and Value of the Institute For Project Management's Two-Week Project Management Course**

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This is a summary version of a complete study that was conducted on current practicing construction industry employees who were voluntary students in the Institute for Project Management's Managing for Profit two-week intensive course. The goal was to obtain data that evaluated the effectiveness of the Institute for Project Management course and on the usefulness and value of an actual ongoing construction continuing education course from current practicing construction industry employees. Since no published papers were located on construction continuing education, hopefully, this will serve to initiate more studies. From this data, administrators of the Institute for Project Management course can extrapolate what most of the students concluded about this one construction continuing education program. The results indicated that the students were satisfied with the course meeting their needs and would attend an advanced project management course if one were offered.

**Key Words:** Continuing Education, Project Management, Mechanical Contractors, IPM Course

## **Introduction**

A review of the literature indicated that there was a growing trend to require all licensed professionals to obtain continuing education in their fields. The literature stated that liability insurance and the promotion of competency-based standards were pushing the growth in state-mandated continuing education. No published research was located on the success or failure of a construction continuing education course. Because the trend nationwide is to require licensed professionals to accrue continuing education credit as part of their license renewal, it is important that these continuing education programs provide substance for the construction professionals. Otherwise, mandated continuing education programs of poor quality provide no value to the consumers or taxpayers that must pay for these licensing programs. The Institute for Project Management course has indicated that a construction continuing education course can be worthwhile and effective.

## **Research Method**

The population for this research was members from the Mechanical Contractors Association of America and those members who were students in the Institute for Project Management's course. Since this course had been taught for more than ten years, there was a large population of past students. Students from nine classes held between 1994 and 1998 were selected for this study. It

was assumed by using the most recently completed classes; addresses would be current and provide a better response rate. These students had a vested interest in the information provided by the Institute for Project Management course as they were currently employed in the mechanical construction industry. These students had experience in construction and the ability to directly apply the principles they were learning in their everyday work duties. These students have also had the opportunity to practice the skills that were learned in the construction continuing education course and could provide quality insight into the training received.

In this study, the investigator developed one instrument to collect data. A questionnaire was developed to elicit responses from past students of the Mechanical Contractors Association of America's Institute for Project Management course. An educational board member from the Mechanical Contractors Association of America and Purdue University's committee on human subjects reviewed the questionnaire before being sent to the students. The questionnaire was mailed out to 268 students who had completed the course. The answers received were then analyzed for the research findings.

### *Questionnaire Responses*

Responses were sought from 268 students of the Mechanical Contractors Association of America's Managing for Profit course. This population represented nine classes of students from 1994 to 1998. All the students were actively employed in the mechanical construction industry and worked for mechanical contractors who were members of the Mechanical Contractors Association of America. One complete mailing to all 268 students' latest known work address was performed. Each individual mailing included a one-page cover letter, a one-page questionnaire, and a stamped return envelope. From the total of 268 mailed questionnaires, 68 were completed and returned. Thirty-nine questionnaires were undeliverable and returned. The overall response rate excluding the undeliverable questionnaires was 30 percent or 68 out of 229. Tests of significance or t-tests were calculated on both the response rates per state and per company and were found to have P-values that were less than 0.01. With a P-value less than 0.05 being considered statistically significant, It can be assumed that the 68 respondents did represent a cross-section of the states and companies.

### *Demographic Information*

The demographic information was of interest and can be used by the Institute for Project Management course administrators to find out where these students were working and how many of the Mechanical Contractors Association of America member companies were sending students. This could be used to help with the strengths and weaknesses in their marketing of the course nationwide. Students attending the nine classes from 1994 to 1998 represented 32 states and Puerto Rico. An average of thirty students attended each class.

The information reported in this section presents demographic information that describes the respondents. The information includes the companies for which the respondents worked, the dates the respondents attended the Managing for Profit course, and the size of the companies employing the respondents.

The pool of potential students to be surveyed was 268 from 149 different mechanical construction companies that included 32 states and Puerto Rico. Each of the nine classes conducted from 1994 to 1998 had an average of 32 students.

Appendix A indicates the distribution of the respondents by state represented. Twenty-two states including Puerto Rico were represented by the respondents of the questionnaire. The largest number of respondents was eight from California comprising 11.76 percent. The second largest number of respondents was seven from Ohio with 10.29 percent. Finally, the third largest number of respondents resided in Massachusetts and was five comprising 7.35 percent of the total respondent population.

Appendix B indicates the number of different mechanical contracting companies where the respondents worked. The companies are listed with a random identification numbers to help ensure the anonymity of the respondents. The company with an identification number of 26 had five responses out of a possible 16. This was both the largest number of responses and the largest number of potential respondents from a company. The second largest number of responses was three each from three different companies. There were a total of 49 different companies represented by the 68 respondents. There were 149 different companies represented out of the current 1505 Mechanical Contractors Association of America member companies.

The size of the mechanical construction companies represented by the respondents is listed in Table 1. The company size was ranked based upon the estimated dollar volume of work in a year. The category with the most respondents was 14 mechanical construction companies doing a volume of \$10 to \$25 million dollars per year. The \$25 million to \$50 million and the \$50 million to \$100 million dollars per year categories each had 12 respondents working for them. Table 1 shows that 75 percent of the respondents worked for contractors performing \$10 million to \$100 million dollars per year.

Table 1

*Size of Respondent's Companies*

<b>Size Based Upon the Annual Estimated Dollar Volume of Work</b>	<b>Number Responding</b>	<b>Percent Responding</b>
\$0 to \$2 Million	0	0.00
\$2 to \$5 Million	4	7.84
\$5 to \$10 Million	2	3.92
\$10 to \$25 Million	14	27.45
\$25 to \$50 Million	12	23.53
\$50 to \$100 Million	12	23.53
\$100+ Million	7	13.73
Total	51	100

The number of respondents per class is listed in Table 2. The course was considered full with 34 students and maintained an average 87.69 percent capacity for the nine courses. The class with the highest number of the respondents was the April-September 1997 Managing for Profit course. However, there were respondents from all nine courses covering the 1994 to 1998 timeframe.

Table 2

*Respondents per Class*

<b>Class</b>	<b>Number Attending Class</b>	<b>Number of Respondents</b>	<b>Percent of Respondents per Class</b>	<b>Total Students Required for a Full Class</b>	<b>Percent of the Class Capacity</b>
Mar. 94 to Sep. 94	26	3	11.54	34	76.47
Oct. 94 to Jan. 95	22	6	27.27	34	65.71
Apr. 95 to Sep. 95	35	5	14.29	34	102.94 <sup>a</sup>
Oct. 95 to Jan. 96	37	9	24.32	34	108.82 <sup>a</sup>
Apr. 96 to Sep. 96	33	8	24.24	34	97.06
Oct. 96 to Jan. 97	30	8	26.67	34	88.24
Apr. 97 to Sep. 97	33	13	39.39	34	97.06
Oct. 97 to Jan. 98	21	4	19.05	34	61.76
May 98 to Sep. 98	31	12	38.71	34	91.18
Total	268	68			

Note: Percent of the class over 100% includes those allowed to reschedule week two with another class.

**Results**

*Support for the Managing for Profit Course*

Correlation statistics were used after the reliability of respondents answers were checked using Cronbach's alpha. Correlation results close to the values of -1 or 1 will indicate the strongest results. The tables included in this section will be used to indicate the results for each research question tested.

Appendix C indicates the mean values of all returned questionnaire statements 1 to 84 and categories A to I. The Likert scale used had a 5 that equaled a response of strongly agree, a 4 equaled a response of agree, a 3 equaled a response of undecided, a 2 equaled a response of disagree, and a 1 equaled a response of strongly disagree. Students also had a "not applicable" choice that was not weighted with any value. The only time the "not applicable" choice had been used by students was in the specific instructor category. This happened because not all students were exposed to all instructors listed in the survey during the nine courses.

*Factors In the Course That Could Influence Each Other*

The students who have completed the two-week course rated the Institute for Project Management course a success and the factors that most strongly associate from the course are listed below. Correlation statistics were completed between some categories and statements and values indicating the strength of association between these categories and statements were analyzed. Values close to 1.0 were considered high correlation values indicated greater strengths of associations. Greater strengths of association mean that changing either one of two variables in a pair will probably change the other variable, but association between two variables is not a guarantee that any change will occur. By considering only the strongest correlation values from either the categories or statements of the questionnaire, 24 pairs indicated that if either of the students' measured opinions or beliefs in the statement or category of the following pairs was changed the other statement or category would probably change. Therefore, it is very important

for the course administrators and MCAA facilitators to consider any future curriculum changes that take into account either factor listed in the pairs within Appendix D.

*What Did the Students Rank as the Most Important Aspects of the Entire Course?*

By breaking the course down into five main categories, the students were asked to rank which category made the course the most successful (question 84). The categories were ranked from 1 being the most important to 5 being the least important. The five categories were the course instructors, the course geographically location, the student interaction, the MCAA facilitators (educational committee members), and the course manuals given to the students. The results indicate that according to the participants the most important category affecting the success of the two-week course was the teaching by the instructors. The second most important category that made the course a success was the student interaction. The third most important category that made the course a success was the MCAA facilitators. The fourth most important category that made the course a success was the course manuals. The least important category that had an overall impact on the success of the course was its geographically location. The results ranked from the students' own opinions of the most important to least important are:

1. Instructors
2. Student Interaction
3. MCAA facilitators
4. Manuals
5. Location

*Written Responses to Questionnaire Questions 85-89*

Questionnaire questions 85-89 were open-ended. The students had an opportunity to address any compliments or concerns about the course in these questions. Responses varied greatly from each individual student who took the time to provide a written response. Some respondents chose to elaborate with many comments while others chose not to respond to any of these open-ended questions. The comments are listed in the following tables as randomly recorded from the questionnaires.

Table 3 lists 33 responses to what topics students would like to see covered in this course (question 85). Some of the frequent responses were (1) more construction scheduling being needed mentioned seven times, (2) time management and organizational skills needed to be covered mentioned five times, and (3) personnel interaction such as leadership skills should also be covered were three times.

Table 4 lists 49 responses to what topics the students would like to see in an advanced course (question 86). Some of the frequent responses were (1) more construction scheduling coverage mentioned twelve times, (2) more coverage of construction claims and liability issues mentioned eight times, and (3) more coverage of contract issues mentioned six times.

Table 3

*Questionnaire Question Eighty-five Results*

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<ul style="list-style-type: none"> <li>• Crisis management</li> <li>• Planning, job start up</li> <li>• E/A labor tracking</li> <li>• How to address in writing typical problem or claims to the owner.</li> <li>• More scheduling understanding.</li> <li>• Prefabrication effectiveness.</li> <li>• How to deal with difficult people such as GC's, owners and people in general.</li> <li>• Scheduling and computer interaction</li> <li>• More on change orders.</li> <li>• Labor productivity, analysis, projections, comparisons of manpower vs schedule, labor impacts, etc.</li> <li>• Cost loaded scheduling.</li> <li>• More time spent on job scheduling / manpower.</li> </ul>	<ul style="list-style-type: none"> <li>• Spend more time on leadership and handling labor problems.</li> <li>• Foreman training, decision making</li> <li>• Computer scheduling</li> <li>• Fabrication and material handling techniques.</li> <li>• Executive order #22, minority participation.</li> <li>• Handling multiple projects, effective day planning. Fast track project, multiple project management.</li> <li>• Class exercise on claims, how to quantify some costs.</li> <li>• I would like the scheduling to be more practical. Every student at a computer and more time spent on it.</li> <li>• I have had several projects where the general contractor is not very organized is there a way to discuss this topic.</li> </ul>	<ul style="list-style-type: none"> <li>• More real life examples of common problems/issues and how good or bad management affects the outcome.</li> <li>• Leadership "Hands On"</li> <li>• Computer for scheduling tool control.</li> <li>• Contracts and disputes.</li> <li>• Labor relations</li> <li>• More time management classes.</li> <li>• None</li> <li>• How to stay organized.</li> <li>• Maybe some project manager computer software.</li> <li>• Multiple project management, estimating, close out (small jobs, multiple crafts, 30 jobs/month)</li> <li>• Inventory management and pre-fab.</li> <li>• Dealing with multiple deadlines.</li> </ul>
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Table 4

*Questionnaire Question Eighty-six Results*

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<ul style="list-style-type: none"> <li>• Negotiations, role playing</li> <li>• Productivity - all aspects</li> <li>• More planning</li> <li>• Methods, labor forecasting</li> <li>• Legal issues (killer clauses), negotiation strategies, financial/banking</li> <li>• How to address in writing typical problem or claims to the owner</li> <li>• Claims</li> <li>• Business development, productivity tracking</li> <li>• Prefabrication.</li> <li>• How to handle manpower shortages, productivity, motivation, computerized CPM scheduling in detail</li> <li>• Insurance and bonding</li> <li>• Job costs forecasting, change order selling.</li> <li>• Advanced computer scheduling resource loading.</li> <li>• More "case study" type topics.</li> <li>• Claims how to better prepare.</li> <li>• Detailed overview on complex issues of claims, change orders and contract issues with construction managers.</li> <li>• No scheduling.</li> <li>• "Volatile" topics i.e.; EEOC, sexual harassment, minority subs and emerging small business.</li> </ul>	<ul style="list-style-type: none"> <li>• Critical path scheduling.</li> <li>• Labor productivity, analysis, projections, comparisons of manpower vs. schedule, labor impacts, etc.</li> <li>• Litigation covered more in depth by instructors that have been through several and can state real examples from experience.</li> <li>• More on claims, liability issues.</li> <li>• Time and personnel scheduling, change orders.</li> <li>• More scheduling as it relates to holding general contractors and owners responsible, diplomacy for presenting changes, cost increase to owners, and computer integration.</li> <li>• Contract language, job costing and projections.</li> <li>• Claims, scheduling, fabrication, problem solving, material handling.</li> <li>• I would like to see students with laptop computers working on certain programs that we deal with on a regular basis</li> <li>• Design build topics</li> <li>• More legal topics such as contracts, claims, etc.</li> <li>• How to maintain current customers while getting new ones.</li> </ul>	<ul style="list-style-type: none"> <li>• Computer scheduling, multiple projects.</li> <li>• Post bid interview, closing deal to be award project.</li> <li>• Scheduling (Sure Track), actual PM giving the course.</li> <li>• Ethics.</li> <li>• More real life examples of common problems/issues and how good or bad management affects the outcome.</li> <li>• Leadership and business planning.</li> <li>• Job cost tracking, day-to-day schedules, and unit of measure.</li> <li>• More advanced contracts and negotiating.</li> <li>• Job cost tracking and time management.</li> <li>• Managers training of project managers.</li> <li>• In depth scheduling.</li> <li>• Financial.</li> <li>• Additional time on advanced scheduling.</li> <li>• More on construction productivity and scheduling.</li> <li>• Financial and business management.</li> <li>• Negotiation work.</li> <li>• Group management, division management.</li> <li>• Jobsite productivity. Cost control / job forecasting.</li> </ul>
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Table 5 lists 49 responses to the factors that have made this course a success (question 87). Some of the frequent responses were (1) interaction with other students was a major factor making this course a success mentioned 21 times and (2) the course instructors also made this course a success mentioned 13 times.

Table 5

*Questionnaire Question Eighty-seven Results*

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<ul style="list-style-type: none"> <li>• The interaction of the students.</li> <li>• MCAA facilitators, other students</li> <li>• Interaction with other students, practical exercises.</li> <li>• MCAA facilitators, "real" situations, interaction, instructor</li> <li>• Facilitators, interaction with other students</li> <li>• All the mechanical contractors that came from different part of the states.</li> <li>• The instructors.</li> <li>• The array of students' background. You can learn a lot by talking with them.</li> <li>• Not many.</li> <li>• Some instructors lack on the job situations.</li> <li>• Good group discussions</li> <li>• Instructor organization and peer group discussions.</li> <li>• Very organized, interesting instructors, nice food in back of class to combat sleepiness.</li> <li>• There is always something that comes up in my everyday job that was discussed in the class.</li> <li>• Focused on being proactive rather than reactive.</li> <li>• Facilitators</li> </ul>	<ul style="list-style-type: none"> <li>• Intensive instruction, diversity of instructors and students, the U.T. campus environment.</li> <li>• I feel this program is more effective for training an inexperienced PM. This is a valuable service for those in that category.</li> <li>• Excellent content and presentation.</li> <li>• Overall package.</li> <li>• Interaction with others would be at top of list.</li> <li>• The individual group activity projects.</li> <li>• Most of the course is applicable to daily work issues.</li> <li>• The instructors and the in class discussions.</li> <li>• Student interaction.</li> <li>• Jack Kennedy and Shirley Tucker</li> <li>• Interaction with managers from all regions.</li> <li>• Most instructors very good with subject matter.</li> <li>• The interaction with other students was a great learning experience.</li> <li>• The class is set up and run professionally.</li> <li>• Instructors / students. Seems everyone had knowledge of the industry.</li> <li>• Interaction with the students, John Koontz.</li> </ul>	<ul style="list-style-type: none"> <li>• Student Interaction</li> <li>• Interaction with other students.</li> <li>• The enthusiasm of the instructors.</li> <li>• The setting the course was held in.</li> <li>• The courses themselves.</li> <li>• Continually updating the subject matter to the industries needs.</li> <li>• Interaction with students from around the nation and specific studies related only to mechanical trades by competent instructors.</li> <li>• Examples from instructors and students.</li> <li>• Interaction and discussion with other students.</li> <li>• Location, distribution of material in two weeks.</li> <li>• The general atmosphere that encouraged each of us to think and broaden how we understand.</li> <li>• Specific areas of instruction and manuals.</li> <li>• Good knowledgeable instructors, different companies from different parts of the country combining ideas.</li> <li>• MCAA commitment</li> <li>• Build confidence our company is doing things right.</li> <li>• Open discussion</li> <li>• Discussions with other peers from around the country.</li> </ul>
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Table 6 lists 39 responses to question 88. Even though all results of this study indicate that this course was not a failure, question 88 was asking for factors that made this course a failure. Therefore, the responses were really problem areas in the course that needed improvement. Some of the frequent responses were (1) that lectures were too long creating boredom mentioned eleven times and (2) the scheduling portion needed improvement mentioned nine times.

Table 7 lists 24 responses to critical evaluation of the Managing for Profit course (question 89). Some of the frequent responses were (1) that more construction topics should be added to the course mentioned four times and (2) more hands-on activities should be added to the course mentioned three times.

**Conclusions**

The following conclusions list important points that were derived from the results and analysis of this study. These can be used to modify and/or support current instructional methods used in the Mechanical Contractors Association of America Institute for Project Management's Managing for Profit course. The list implies no order in importance of conclusions.

Table 6

*Questionnaire Question Eighty-eight Results*

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<ul style="list-style-type: none"> <li>• The only bad experience was waiting for transportation.</li> <li>• None</li> <li>• Too much scheduling.</li> <li>• Scheduling (Primavera) not taught well.</li> <li>• Calin Popescu trying to sell scheduling software. Language barrier is tough.</li> <li>• TQM instructor was ill prepared; presentation unorganized and lacked enthusiasm or conviction was reflected in presentation.</li> <li>• Shirley Tucker does not seem to have an understanding of our profession.</li> <li>• Calin is knowledgeable but he is not a very good presenter. It is too long a time frame for someone like him to talk. It is a hard topic to make exciting but it needs improvement. Overall, I thought the class was great and would highly recommend it to anyone.</li> <li>• Too much lecture without interactions.</li> <li>• CPM scheduling - Instructor was good, material not relevant.</li> <li>• Long days and too much sitting.</li> <li>• Too much detail on scheduling!</li> <li>• Some instructors seemed "outdated."</li> </ul>	<ul style="list-style-type: none"> <li>• The course is not a failure.</li> <li>• Hard for some to get to Austin, TX. Rotating locations may spark attendance.</li> <li>• Went over a good bit of information that was already being used in our company.</li> <li>• Spending too much time on less important topics.</li> <li>• Some of the instructors don't come through to the students.</li> <li>• More input from actual current owners of companies. Less from "teachers". More class interaction and discussion.</li> <li>• Long-winded speaking, redundant issues, long days.</li> <li>• Not all instructors are at the same level. Mr. Tuckers's lecture on future of construction was poor.</li> <li>• Some topics were too long and boring.</li> <li>• Having an instructor teach Sure Track instead of a project manager / scheduler in construction.</li> <li>• I was looking for more interaction with experienced project managers.</li> <li>• Training aids are weak.</li> <li>• Too much of the material as covered and re-covered under another topic.</li> </ul>	<ul style="list-style-type: none"> <li>• Very poor manual</li> <li>• Romanian scheduling (way too much).</li> <li>• Didn't feel safety was done well or didn't fit right with the course material.</li> <li>• Too much time devoted to scheduling. Important, but needs to be pared down.</li> <li>• Very few instructors need to change the style to keep the class participating more.</li> <li>• Some of the lectures and lecturers were to long or monotonous. Became boring.</li> <li>• The course should have added days during the week 7 full days with 8-hour durations.</li> <li>• Classroom atmosphere and length of daily presentation.</li> <li>• P.M.'s do not sit still for this long and attention was lost at the end of the day.</li> <li>• Not a failure per se, but the days were a little long for us "older guys"</li> <li>• The only thing that would cause this to be a failure is the attendee not having an interest in learning.</li> <li>• Job scheduling could be shortened.</li> <li>• At the time, I took course there was too much lecturing from overheads. Not enough use of a variety of teaching techniques.</li> </ul>
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1. The 24 strongly correlated pairs of categories and statements indicated earlier in this paper should be taken into consideration when changing the course to ensure that the students' opinions of this course will not be affected negatively.
2. Contractors from 32 states and Puerto Rico attended but there are Mechanical Contractors Association of America member contractors in every state that could attend.
3. Only 149 different companies sent employees to the course. There is tremendous room to improve this number since the Mechanical Contractors of America has 1505 member companies.
4. Classes had only an average of 87.69 percent capacity of potential students. The MCAA facilitators and administrators need to evaluate if this attendance rate is sufficient.
5. From statements 1-4 the following was supported by the results. The students expected to learn a great deal of project management skills in the Managing for Profit course and they indicated that after completion of the course they did find the project management skills gained during the course useful in their work. They also agreed that the information obtained from the course covered their company's investment. Finally, they thought that this was one of the best industry courses they have attended.
6. The students were overwhelmingly satisfied with the Managing for Profit course. Although, there is room for improvement in all categories.
7. Students agreed that they expected to learn a great deal of project management skills in the Managing for Profit course and they also agreed that they found the project management skills gained useful in work.



Table 7

*Questionnaire Question Eighty-nine Results*

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<ul style="list-style-type: none"> <li>• Call SMACNA and emulate their program.</li> <li>• Scheduling training could be done as a correspondence course via Internet with class discussion and application done in Texas.</li> <li>• Hands on scheduling.</li> <li>• I think that a better mix of students from contractors with similar business volumes would help tremendously.</li> <li>• More topics touched. Maybe shorten some of the other topics already being discussed.</li> <li>• Shorten up safety to about 2-3 hours. As with anything else in life you get out of what you put into it. For myself, I went into this course expecting to learn "new" things. What I came away with was validation of things I have been doing for years but had forgotten why. Different perspectives on old procedures. New ideas to tackle old problems and several new concepts all together. Overall, I felt the program was very well done. There were a few classes that should be shortened and a few that should be lengthened. And advanced project management course for senior PM's, like myself, would be very welcome.</li> <li>• Overall, a very good course. Very much enjoyed the experience.</li> </ul>	<ul style="list-style-type: none"> <li>• Use more instructors from pier group (i.e. owners and senior officers).</li> <li>• Too much theory, not enough hands-on. I'm an engineer so this was not a problem, but most of the students were not. They wanted more hands on work or lab work. Also, I think you need more examples of the different forms used from different companies.</li> <li>• Would like more "informal" time with other students. Not necessarily free time, but more discussion time.</li> <li>• I can't remember which instructors taught which sections. You should have identified their section next to their name.</li> <li>• Overall, excellent course that strengthened my ability as a PM.</li> <li>• The course was excellent but scheduling is very involved and should be limited.</li> <li>• Complex issues of negotiating and paperwork trail are very important.</li> <li>• Mrs. Tucker's presentations took up too much of the course. Paul is a nice person, but should retire from the program. His presentations were poor, outdated, and irrelevant.</li> <li>• A little less time on personality profiles, time management, leadership, motivation, and team building. Time would be better spent on "case study".</li> </ul>	<ul style="list-style-type: none"> <li>• Overall, this was one of the most positive learning experiences I have ever had.</li> <li>• Addressing change order for small companies. This topic was dealt with as though everyone worked for large sue happy contractors.</li> <li>• A lot of undecideds are due to having taken course so long ago.</li> <li>• More on contracts and claims, computer scheduling.</li> <li>• Too many charts and graphs with the same information only in a different form. Week 2 book was not much different from week 1. These folders could be condensed to a readable size and still have all the information included.</li> <li>• I would like to see more time spent on computerized project scheduling.</li> <li>• Try and include some more hands-on activities during the lectures.</li> <li>• The MCAA (IPM) should make sure that each new student has the proper PM experience. This course is not for the new PM but should be for the PM with a few jobs under his belt. As a student who did take this class with out much of a PM background, I found myself unable to participate in a lot of classroom meetings for no other reason than the large amount of experience around me.</li> </ul>
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8. While students rated the most important major factors that made the course a success were the instructors and the student interaction throughout the course, the specific instructors had the least amount of association to the success of any other part of the course.
9. The least important factors associated with the course are its location and manuals. The manuals need to be evaluated and rewritten based on students' comments.
10. The two individual factors that students' believed made the course a success were that the Managing for Profit course provided an opportunity to learn from other students and that the job cost control topic was the most important covered.
11. Additional topics that should be covered included more scheduling, time management and organization, and personnel interaction skills as well as more hands-on activities.
12. Frequently mentioned factors making this course a success included interaction with other students and course instructors.
13. Frequently mentioned factors that needed improvement were long lectures and the manner in which scheduling was taught.
14. Students agreed that they would recommend this course and attend an advanced project management course. In the advanced course, students would like to see topics on claims and liability issues, more scheduling, and contract issues.

## **Recommendations**

While this research was being conducted, it became evident that there were other areas that needed to be investigated. These areas would clarify, challenge, and increase the database on the Institute for Project Management course. Some of these areas needing investigation are identified in the following itemized listing.

1. A similar study should be conducted on the owners of the mechanical construction firms for whom the students worked. The owners would then have a chance to give input as to the success or failure of the Managing for Profit course by evaluating their employees' work with the new project management skills.
2. A study could be conducted throughout the two-week course questioning the students before, during, and after completion of the course or each day to get more questions specifically about various aspects of the classes in the course.
3. Prospective students to the Mechanical Contractors Association of America' Managing for Profit course could take a pre-test before attending the course. Then take a posttest one-year after completing the course. This would allow a numerical improvement in their knowledge of project management skills to be compiled and these results could be compared with their own reported project management changes.
4. All 1505 Mechanical Contractors Association of America should be surveyed to find out the reasons they are either sending or not sending their Project Management staff to the Managing for Profit course.

## **Summary**

The Institute for Project Management has developed and maintained a construction continuing education program that is considered effective and valuable by former students. While there is room for improvement, careful consideration should be given to any major changes in the program. From the students' written responses several areas that need attention have been revealed but they are far from affecting the course success. This success has led to a desire by the students to have an advanced project management program sponsored by the Institute for Project Management.

While this study has collected much information on the Institute for Project Management two-week project management course, it will be up to the course administrators to decide how to use this information. This study was not meant to suggest specific ways to change or move the course direction, but to inform the administration of students' opinions on the current effectiveness and value of the course. It is the opinion of this researcher that if any major changes were to occur in the course, further study should be conducted to ensure that the owners of mechanical contracting firms have input too.

## References

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## Appendix A

### *States of Respondents*

State	Number Responding from a State	Percent Responding	Number of Possible Respondents from a State	Percent Possible Responding
Arizona	0	0.00	2	0.75
Arkansas	0	0.00	1	0.37
California	8	11.76	23	8.58
Colorado	4	5.88	8	2.99
Connecticut	1	1.47	1	0.37
Florida	0	0.00	6	2.24
Georgia	1	1.47	5	1.87
Illinois	4	5.88	12	4.48
Indiana	0	0.00	5	1.87
Iowa	2	2.94	6	2.24
Kansas	2	2.94	4	1.49
Louisiana	0	0.00	7	2.61
Maryland	0	0.00	4	1.49
Massachusetts	5	7.35	16	5.97
Michigan	4	5.88	20	7.46
Minnesota	3	4.41	16	5.97
Missouri	3	4.41	10	3.73
Montana	0	0.00	1	0.37
Nebraska	4	5.88	7	2.61
New York	1	1.47	13	4.85
New Jersey	2	2.94	5	1.87
North Carolina	1	1.47	2	0.75
Ohio	7	10.29	28	10.45
Oregon	2	2.94	8	2.99
Pennsylvania	2	2.94	8	2.99
Puerto Rico	3	4.41	6	2.24
Rode Island	2	2.94	3	1.12
Tennessee	0	0.00	2	0.75
Texas	1	1.47	9	3.36
Utah	0	0.00	3	1.12
Washington	3	4.41	8	2.99
West Virginia	0	0.00	1	0.37
Wisconsin	3	4.41	18	6.72
Total	68	99.96 <sup>a</sup>	268	100.03

Note: <sup>a</sup> Does not sum to 100% due to rounding.

## Appendix B

### *Companies of Respondents*

<b>ID Number</b>	<b>Number Responding from Company</b>	<b>Percent Responding</b>	<b>Number of Possible Respondents in a Company</b>	<b>Percent Possible Responding</b>
1	3	4.41	3	1.12
2	2	2.94	2	0.75
3	1	1.47	1	0.37
4	2	2.94	3	1.12
5	1	1.47	3	1.12
6	1	1.47	1	0.37
7	2	2.94	2	0.75
8	1	1.47	2	0.75
9	1	1.47	3	1.12
10	1	1.47	1	0.37
11	1	1.47	10	3.73
12	1	1.47	1	0.37
13	1	1.47	2	0.75
14	1	1.47	4	1.49
15	2	2.94	4	1.49
16	2	2.94	9	3.36
17	1	1.47	2	0.75
18	1	1.47	9	3.36
19	2	2.94	5	1.87
20	1	1.47	1	0.37
21	1	1.47	1	0.37
22	2	2.94	4	1.49
23	1	1.47	3	1.12
24	1	1.47	3	1.12
25	1	1.47	1	0.37
26	5	7.35	16	5.97
27	3	4.41	5	1.87
28	1	1.47	1	0.37
29	1	1.47	3	1.12
30	1	1.47	4	1.49
31	3	4.41	5	1.87
32	2	2.94	2	0.75
33	1	1.47	1	0.37
34	2	2.94	2	0.75
35	1	1.47	1	0.37
36	1	1.47	1	0.37
37	1	1.47	3	1.12
38	1	1.47	1	0.37
39	1	1.47	1	0.37
40	1	1.47	4	1.49
41	1	1.47	2	0.75
42	1	1.47	3	1.12
43	1	1.47	1	0.37
44	1	1.47	3	1.12
45	1	1.47	2	0.75
46	1	1.47	1	0.37
47	1	1.47	1	0.37
48	1	1.47	1	0.37
49	1	1.47	1	0.37
50	0	0.00	1	0.37
51	0	0.00	1	0.37
52	0	0.00	1	0.37/0.37
53	0	0.00	1	0.37
54	0	0.00	1	0.37
55	0	0.00	1	0.37
56	0	0.00	1	0.37
57	0	0.00	1	0.37
58	0	0.00	2	0.75
59	0	0.00	1	0.37/0.75
60	0	0.00	2	0.75
61	0	0.00	1	0.37

62	0	0.00	1	0.37
63	0	0.00	1	0.37
64	0	0.00	2	0.75
65	0	0.00	2	0.75
66	0	0.00	1	0.37
67	0	0.00	1	0.37
68	0	0.00	1	0.37
69	0	0.00	1	0.37
70	0	0.00	1	0.37
71	0	0.00	1	0.37
72	0	0.00	1	0.37
73	0	0.00	1	0.37
74	0	0.00	1	0.37
75	0	0.00	2	0.75
76	0	0.00	1	0.37
77	0	0.00	1	0.37
78	0	0.00	1	0.37
79	0	0.00	1	0.37
80	0	0.00	2	0.75
81	0	0.00	2	0.75
82	0	0.00	1	0.37
83	0	0.00	1	0.37
84	0	0.00	2	0.75
85	0	0.00	1	0.37
86	0	0.00	1	0.37
87	0	0.00	2	0.75
88	0	0.00	1	0.37
89	0	0.00	1	0.37
90	0	0.00	2	0.75
91	0	0.00	1	0.37
92	0	0.00	2	0.75
93	0	0.00	1	0.37
94	0	0.00	1	0.37
95	0	0.00	1	0.37
96	0	0.00	1	0.37
97	0	0.00	3	1.12
98	0	0.00	1	0.37
99	0	0.00	1	0.37
100	0	0.00	1	0.37/0.37
101	0	0.00	1	0.37
102	0	0.00	3	1.12
103	0	0.00	1	0.37
104	0	0.00	2	0.75
105	0	0.00	2	0.75
106	0	0.00	1	0.37
107	0	0.00	1	0.37
108	0	0.00	2	0.75
109	0	0.00	1	0.37
110	0	0.00	1	0.37
111	0	0.00	1	0.37
112	0	0.00	1	0.37
113	0	0.00	1	0.37
114	0	0.00	1	0.37
115	0	0.00	2	0.75
116	0	0.00	1	0.37
117	0	0.00	1	0.37
118	0	0.00	1	0.37
119	0	0.00	1	0.37
120	0	0.00	1	0.37
121	0	0.00	1	0.37
122	0	0.00	1	0.37
123	0	0.00	1	0.37
124	0	0.00	1	0.37
125	0	0.00	1	0.37
126	0	0.00	1	0.37
127	0	0.00	1	0.37
128	0	0.00	1	0.37
129	0	0.00	1	0.37
130	0	0.00	1	0.37
131	0	0.00	2	0.75

132	0	0.00	2	0.75
133	0	0.00	1	0.37
134	0	0.00	1	0.37
135	0	0.00	1	0.37
136	0	0.00	1	0.37
137	0	0.00	1	0.37
138	0	0.00	1	0.37
139	0	0.00	1	0.37
140	0	0.00	1	0.37
141	0	0.00	1	0.37
142	0	0.00	1	0.37
143	0	0.00	1	0.37
144	0	0.00	2	0.75
145	0	0.00	1	0.37
146	0	0.00	1	0.37
147	0	0.00	1	0.37
148	0	0.00	1	0.37
149	0	0.00	2	0.75
Total	68	99.96 <sup>a</sup>	268	99.90 <sup>a</sup>

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Note: <sup>a</sup> Does not sum to 100% due to rounding.

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## Appendix C

### *Questionnaire Results Statements 1 to 84 and Categories A to I*

Questions (5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly Disagree)	Mean Values
1. Before I attended the course, I expected to learn a great deal of Project Management Skills.	4.27
2. After I attended the course, I have found the Project Management Skills useful in work.	4.16
3. Overall, I think that the information obtained from this course covered my company's investment	4.15
4. Overall, this course was one of the best industry related courses I have attended.	4.08
A. Usefulness/Relevance of Content	3.92
5. Overall, I have become a more effective Project Manager	4.04
6. Overall, this course contributes significantly to my professional growth.	4.06
7. Overall, I can apply information/skills learned in this course.	4.22
8. Overall, my technical skills were improved as a result of this course.	3.64
9. Overall, this course directly contributes to my job.	4.15
10. Overall, the practical application of subject matter is apparent.	4.01
11. Overall, this course is up-to-date with developments in the field.	3.87
12. Overall, this course includes a sufficient number of practical exercises.	3.73
13. Overall, the amount of material covered was reasonable.	3.79
B. Specific Course Areas	4.10
14. Overall, contracts was a valuable topic to cover.	4.18
15. Overall, job cost control was a valuable topic to cover.	4.41
16. Overall, scheduling was a valuable topic to cover.	3.99
17. Overall, productivity was a valuable topic to cover.	4.27
18. Overall, claims was a valuable topic to cover.	4.07
19. Overall, people skills (leadership, communication) was a valuable topic to cover.	4.04
20. Overall, change orders was a valuable topic to cover.	4.37
21. Overall, safety was a valuable topic to cover.	3.99
22. Overall, project administration and implementation was a valuable topic to cover.	4.22
23. Overall, personal action plan (project completed between classes) was a valuable topic to cover.	3.63
C. Course Goals or Objectives	3.87
24. Overall, this course has clearly stated objectives	3.96
25. Overall, the objectives of this course were clearly explained to me.	3.90
26. Overall, the goals of this course are consistently pursued.	4.03
27. Overall, the objectives of this course allow me to know when I am making progress.	3.54
28. Overall, I was able to set and achieve some of my own goals.	3.91
29. Overall, lecture information is highly relevant to course objectives.	3.90
30. Overall, the course content is consistent with my prior expectations.	3.87
D. Discussion	4.06
31. Overall, the instructors developed classroom discussions skillfully	4.04
32. Overall, there is sufficient time in class for questions and discussions.	3.90
33. Overall, the instructors allow student discussion to proceed uninterrupted.	3.99
34. Overall, the instructors encourage students to debate conflicting views.	4.01
35. Overall, the instructors do not monopolize classroom discussion.	3.97
36. Overall, the real strength of this course is the classroom discussion.	4.32
37. Overall, challenging questions are raised for discussion.	3.79
38. Overall, this course provides an opportunity to learn from other students.	4.54
E. Clarity and Effectiveness of Presentations	3.94
39. Overall, my instructors display a clear understanding of course topics.	4.22
40. Overall, my instructors are able to simplify difficult materials.	3.79
41. Overall, difficult topics are structured in easily understood ways.	3.75
42. Overall, my instructors have effective styles of presentation.	3.88
43. Overall, my instructors seem well-prepared for classes.	4.19
F. Student Interest/Involvement in Learning	3.81
44. Overall, the instructors make learning easy and interesting.	3.85
45. Overall, the instructors hold the attention of the class.	3.66
46. Overall, the instructors sense when students are bored.	3.37
47. Overall, the instructors display enthusiasm when teaching.	3.90
48. Overall, this course supplies me with an effective range of challenges.	3.93
49. Overall, in this course, many methods are used to involve me in learning.	3.99
50. Overall, the instructors make me feel involved with this course.	3.93
51. Overall, in this course, I always felt challenged and motivated to learn.	3.75
52. Overall, this course motivates me to take additional continuing education courses.	3.91
G. Specific Instructors	3.40
53. Overall, the quality and effectiveness of Shirley Tucker's instruction was excellent.	3.59
54. Overall, the quality and effectiveness of John Borcharding's instruction was excellent.	4.02
55. Overall, the quality and effectiveness of Jack Kennedy's instruction was excellent.	4.40

56. Overall, the quality and effectiveness of Jim Broaddus' instruction was excellent.	3.74
57. Overall, the quality and effectiveness of Calin Popescu's instruction was excellent.	3.50
58. Overall, the quality and effectiveness of Pete Chaney's instruction was excellent.	3.81
59. Overall, the quality and effectiveness of Dennis Johnson's instruction was excellent.	3.83
60. Overall, the quality and effectiveness of MCAA Contractor Facilitators' instruction was excellent.	4.22
H. Broadening Student Outlook	3.82
61. Overall, my instructors have stimulated my thinking.	3.98
62. Overall, my instructors have provided many challenging new viewpoints.	3.86
63. Overall, my instructors taught one to value the viewpoint of others.	3.91
64. Overall, this course caused me to reconsider many of my former attitudes.	3.61
65. Overall, in this course, I have learned to value new viewpoints.	3.95
66. Overall, this course stretched and broadened my views greatly.	3.74
67. Overall, this course has effectively challenged me to think.	3.88
I. General Student Perceptions	3.73
68. Overall, the class mixture is appropriate.	4.05
69. Overall, the size of this class is appropriate to course objectives.	4.14
70. Overall, the facilities for this course are excellent.	4.29
71. Overall, I would highly recommend this course.	4.44
72. Overall, I like the way the instructors conduct this course.	4.09
73. Overall, I am satisfied with my accomplishments in this course.	4.03
74. Overall, I have put much effort into this course.	4.02
75. Overall, the Instructors of this course made the course effective.	3.97
76. Overall, the team usage made this course effective.	4.11
77. The time between class meetings was too long.	2.66
78. The class should be condensed into 1 week.	2.11
79. The course should always be held in Austin, Texas	3.44
80. The course should be held in different regions of the country.	3.30
81. I would attend a 3 day advanced Project Management course	4.26
82. I believe that portions of this course could be completed via the Internet before coming to class.	3.09
83. How many of your fellow classmates have you contacted since the completion of the course?	1.87 Average
84. Please rank the following in order from 1 as the best to 5 as order of course importance:	

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Instructors 2.32    Location 3.91    Interaction with other students 2.40    MCAA Facilitators 3.06    Manuals 3.42

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## Appendix D

### *Factor listed in the pairs*

#### Pair one

- The students' belief that this was one of the best industry courses they have attended (statement 4).
- The students' belief that this course was a good company investment (statement 3).

#### Pair two

- The students' belief that the project management skills were useful in work (statement 2).
- The students' belief that this was one of the best industry courses they have attended (statement 4).

#### Pair three

- The students' belief that the project management skills were useful in work (statement 2).
- The students' belief that this course was a good company investment (statement 3).

#### Pair four

- The students' belief that the project management skills were useful in work (statement 2).
- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).

#### Pair five

- The students' belief that this course was a good company investment (statement 3).
- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).

#### Pair six

- The students' belief that this was one of the best industry courses they have attended (statement 4).
- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).

#### Pair seven

- The students' opinions of the course having clear and effective presentations (category E).
- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).

#### Pair eight

- The students' opinions of the course broadening their outlook (category H).
- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).

#### Pair nine

- The students' opinions of the general perceptions of the course meeting their needs (category I).
- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).

#### Pair ten

- The students' belief that this course was a good company investment (statement 3).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair eleven

- The students' belief that this was one of the best industry courses they have attended (statement 4).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair twelve

- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair thirteen

- The students' opinions of the course having clear and effective presentations (category E).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair fourteen

- The students' interest and involvement in learning (category F).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair fifteen

- The students' opinions of the course instructors' instruction meeting their needs (category G).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair sixteen

- The students' opinions of the course broadening their outlook (category H).
- The students' opinions of the course goals and objectives meeting their needs (category C).

#### Pair seventeen

- The students' opinions of the general perceptions of the course meeting their needs (category I).
- The students' opinions of the course goals and objectives meeting their needs (category C).

Pair eighteen

- The students' opinions of the course having clear and effective presentations (category E).
- The students' belief of the course discussions meeting their needs (category D).

Pair nineteen

- The students' interest and involvement in learning (category F).
- The students' belief of the course discussions meeting their needs (category D).

Pair twenty

- The students' interest and involvement in learning (category F).
- The students' opinions of the course having clear and effective presentations (category E).

Pair twenty-one

- The students' opinions of the course broadening their outlook (category H).
- The students' interest and involvement in learning (category F).

Pair twenty-two

- The students' opinions of the general perceptions of the course meeting their needs (category I).
- The students' interest and involvement in learning (category F).

Pair twenty-three

- The students' belief of the usefulness and relevance of the course content meeting their needs (category A).
- The students' opinions of the course broadening their outlook (category H).

Pair twenty-four

- The students' opinions of the general perceptions of the course meeting their needs (category I).
- The students' opinions of the course broadening their outlook (category H).