The Impact of a Project Management Course on Student Perceptions of the Importance of Expertise Needed by Project Managers: An Empirical Assessment

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Abstract

Project management is an increasingly important subject in both practical and academic circles. Good project managers are in high demand and short supply. Pressure has been increasingly placed on universities to better prepare students for project management positions. The short supply of project managers has also motivated companies to take advantage of project management training and certification programs offered by the Project Management Institute (PMI). This paper assesses the impact of a project management course on student perceptions of the extent to which numerous areas of expertise contribute to project manager effectiveness. Perceptions of the importance of change management, PERT, CPM, and function point analysis demonstrated the greatest modification as the result of taking the course. Other areas of expertise that increased in experience as well as areas of expertise that decreased in importance in the minds of project management students are also identified.

Keywords: Project managers, perception, knowledge areas

Introduction

The importance of project management courses is increasing in higher education institutions. Project management courses are found in building construction, computing, engineering, and operations management curricula.

Project management is especially important in computing disciplines (computer science, information systems, information technology, and software engineering) because the demand for capable team and project managers to lead information technology (IT) acquisition, development, and implementation projects is increasing. There is little question that organization demand for capable project managers has been and remains strong (Herzberg, 2006; Schur, 2001). In its latest round of CIO interviews, the Standish Group reported that IT project success is often directly attributable to the leadership provided by experienced project managers (http://www.standishgroup.com/sample_research/index.php).

Because good project managers are in high demand and short supply, employers are placing increasing pressure on universities to better prepare students to contribute to project teams and assume project management positions. As a result, an increasing number of universities have made project management a required or elective course in computing (and/or other) disciplines. Short supplies of project managers have also motivated organizations to turn to the Project Management Institute (PMI) for project management training and certification programs.

Purpose of Current Investigation

The primary purpose of this investigation is to gain insights into student perceptions of what project managers need to know (have expertise in) before taking a project management course and to assess how these perceptions change

as the result of being exposed to project management course concepts. Secondary objective of this investigation were to assess whether initial perceptions and changes in perceptions are influenced by major, gender, and extent of business knowledge. This investigation was also carried out to provide course assessment data for both ABET (which accredits the university's IT degree program) and AACSB (which accredits the university's IS and other business degree programs).

Methodology

Thirty-seven undergraduate students enrolled in two sections of project management taught by the same instructor at a regional university in the Southeast provided answers to a survey instrument (see Appendix A). The survey asked students to indicate how much expertise is needed in each of 96 areas of expertise. The areas of expertise included on the survey were selected from several sources including characteristics identified by the PMI, and articles published by Bigelow, Gould & Freeman, White, and Wu (see reference list). A seven-point response scale was used: 0 (I am not familiar with this knowledge area), 1 (I am familiar with this knowledge area, but don't know if project manger expertise in this area is needed), 2 (No knowledge of this area is needed), 3 (Some knowledge of this area is needed, 4 (More than some knowledge of this area is needed), 5 (Much knowledge of this area is needed), and 6 (Very much knowledge of this area is needed).

The survey was completed twice by each student: once during the second week of Fall Semester 2006 and once during the final week of Fall Semester 2006. The sample was predominantly male (27 males vs. 7 females) and consisted primarily of IT majors (33 IT majors vs. 3 IS majors). Eighty-nine percent of the students were between 21 and 23 years of age and all but one of the students were in their senior year.

Preliminary Results

Table 1 summarizes the areas of expertise with the highest mean ratings at the beginning of the project management course. These might be construed as being areas of expertise that students perceived to be most closely associated with effective project managers prior to taking a detailed look at project management processes during the course. The standard deviations indicate tight response distributions for most areas of expertise

Table 1. Expertise Areas with Highest Mean Ratings at Start of Course

Area of Expertise	Minimum	Maximum	Mean	Std. Deviation
Motivation	5	6	5.67	.478
Decision Making	4	6	5.67	.535
Planning	4	6	5.64	.593
Assigning Priorities	4	6	5.64	.593
Organizing	4	6	5.61	.599
Time Management	3	6	5.61	.688
Evaluating Decision Alternatives	4	6	5.58	.604
Leadership	1	6	5.58	.967
Effective Listening	4	6	5.53	.654
Problem Solving	3	6	5.53	.696
Scheduling	3	6	5.50	.697
Team Building	4	6	5.50	.655
Oral Communication	4	6	5.50	.737
Assign Responsibilities	4	6	5.50	.655
Logical Thinking	4	6	5.47	.654

Table 2 summarizes the areas of expertise with the lowest mean ratings at the beginning of the project management course. These might be construed as being areas of expertise that students perceived to be least closely associated with effective project managers prior to taking a detailed look at project management processes during the course. Closer examination of Table 2 reveals that the distribution of responses across response options was wide for many of these expertise areas and that some students had no prior knowledge of these areas (provided a response of zero on the scale) or didn't know how the area was related to project management (provided a scale response of 1).

Table 2. Expertise Areas with Lowest Mean Ratings at Start of Course

Area of Expertise	Minimum	Maximum	Mean	Std. Deviation
Sales	1	6	4.14	1.222
Sociology	0	6	4.09	1.522
Psychology	1	6	4.00	1.414
Collaboration Software	0	6	3.97	2.035
Procurement	0	6	3.53	2.118
Ergonomics	0	6	3.44	1.992
Critical Path Method	0	6	3.00	2.640
Change Management	0	6	2.94	2.543
PERT	0	6	2.69	2.638
Function Point Analysis	0	6	2.67	2.541

Table 3 summarizes the areas of expertise with the highest mean ratings at the end of the course and Table 4 summarizes the areas of expertise with the lowest mean ratings at the end of the course. These might be construed as the areas of expertise that students perceived the most (and least) closely associated (respectively) with effective project managers at the conclusion of the course.

Table 3. Expertise Areas with Highest Mean Ratings at End of Course

Ares of Expertise	Minimum	Maximum	Mean	Std. Deviation
Leadership	5	6	5.78	.422
Time Management	3	6	5.67	.632
Oral Communication	4	6	5.58	.649
Organizing	3	6	5.58	.692
Scheduling	4	6	5.54	.611
Planning	4	6	5.53	.609
Decision Making	4	6	5.50	.655
Motivation	3	6	5.50	.737
Management Principles	4	6	5.50	.655
Assigning Priorities	3	6	5.47	.736
Making Presentations	3	6	5.42	.806
Change Management	2	6	5.42	.937
Problem Solving	3	6	5.39	.803
Budgeting	4	6	5.39	.645
Written Communication	3	6	5.39	.871
Critical Path Method	2	6	5.36	.833
Controlling	3	6	5.36	.798

Although there is considerable similarity between Tables 1 and 3 suggesting that much of the students' initial thinking about the areas of expertise associated with effective project management was not changed by the course. However, it is interesting to note that management principles, making presentations, change management, budgeting, written communication, CPM, and controlling had worked their way toward the top of the list by the end of the course.

Table 4. Expertise Areas with Lowest Mean Ratings at End of Course

Ares of Expertise	Minimum	Maximum	Mean	Std. Deviation
Programming	1	6	4.39	1.248
Finance	2	6	4.39	.964
Accounting	3	6	4.33	.862
Software Engineering	0	6	4.33	1.434
CASE tools	0	6	4.31	1.670
Procurement	0	6	4.28	1.717
Economics	1	6	4.26	1.291
Marketing	0	6	4.08	1.442
Sales	0	6	4.03	1.464
Ergonomics	0	6	4.00	1.724

Comparing Tables 2 and 4 indicates considerable shake up in student perceptions of what is least important areas of expertise for project managers with only sales and ergonomics at the bottom of the list at the end of the semester. The standard deviations indicate considerable student variability in perceptions of importance

Because each student was surveyed about each area of expertise at both the beginning and end of the course, it was possible to calculate the mean change in student perceptions for each area of expertise. This was accomplished by subtracting each student's rating of an expertise area at the beginning of the course from his/her rating of the same area of expertise at the end of the course. Expertise areas with positive mean changes suggest that students perceived them to be more important at the end of the course than at the beginning. Expertise areas with negative mean changes suggest that students perceived them to be less important at the end of the course that at the beginning.

Table 5. Expertise Areas Demonstrating the Highest Positive Mean Change

Area of Expertise	Mean Change
Change Management	2.5143
PERT	2.4286
Critical Path Method	2.3611
Function Point Analysis	2.3611
Collaboration Software	.7778
Procurement	.7500
Incentive Systems	.5833
Feasibility Analysis	.5833
Probability	.5556
Ergonomics	.5556

Table 5 summarizes the areas of expertise demonstrating the greatest positive mean changes in perceived importance from the beginning to the end of the course. The results of paired t-tests indicated that all changes summarized in the Table were significant at the .06 level or higher.

Some of the increases in perceived importance of areas of expertise are readily explainable. For example, the majority of the students were IT majors (rather than IS majors) and had not been exposed to PERT or CPM (the Critical Path Method) by virtue of not taking a business quantitative methods course. This fact, combined with homework exercises and course projects requiring PERT and CPM solutions as well as further exposure to these in Microsoft Project assignments, is likely to have kept these techniques in the forefront of student thinking about project management. Other increases in perceived importance (e.g. those for change management, collaboration software, procurement, etc.) suggest that students have been positively impacted by concepts stressed in the course.

Table 6 summarizes the areas of expertise that showed the greatest declines in perceived importance from the beginning to the end of the course. It should be noted that in terms of magnitude mean negative changes are typically less than the mean positive changes that were observed. The results of paired t-test indicated that only the declines for evaluating decision alternatives and presentation software were significant at the .05 level or higher

Table 6. Expertise Areas Demonstrating the Highest Negative Mean Change

Area of Expertise	Mean Change
Assign Responsibilities	-.2222
Conflict Resolution	-.2222
Economics	-.2286
Email	-.2353
Finance	-.2500
Impartial Judgment	-.2857
Team Building	-.3056
Data Normalization	-.3333
Evaluating Decision Alternatives	-.3889
Presentation Software	-.4444

Positive mean changes were observed for 45 expertise areas. Negative mean changes were observed for 46 expertise areas. The remaining five expertise areas had mean changes of 0.0000. Changes were less than a quarter of a scale value (were less than .2500 in either direction) for 70 of the 96 expertise areas.

Planned Analyses

Further analyses will be conducted to identify the demographic factors best predict the observed perception changes. Of particular interest if whether students with business knowledge (IS majors and IT majors with business second disciplines) demonstrate systematic differences in changes from those that do not. Analyses directed toward assessing whether changes in student perceptions are consistent with course and degree program objectives (both IT and IS) are also planned. More data will be collected in the future semesters for a better sample size, and to make sure all groups are well represented.

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Thank you for participating in this survey. The purpose is to collect information on Project Management. This survey is anonymous. Individual responses will be kept strictly confidential. The survey will take approximately 10 minutes to complete.

I. Demographics (Please check one)

1. Gender: □ Male □ Female

2. Age: _____ years

3. Status: □ Freshmen □ Sophomore □ Junior □ Senior

4. Major □ Information Systems □ Information Technology
□ Others (please specify) _____

5. Minor □ Yes, please specify _____ □ No, n/a

6. Second discipline □ Yes, please specify _____ □ No, n/a

7. Transfer student □ Yes, please provide the name of institution _____
□ No

II. How much expertise do project managers need in each of the following areas? Please check only one for each area.

	3. None	4.	5.	6.	7. Very Much	1. I am not familiar with this area	2. I am familiar with this area, but don't know if it is important for a Project Manager and Project Management
Mathematics							
Probability							
Statistics							
Accounting							