Assessing the Methods Used to Determine the Effectiveness of a Graduate Technical Project Management Degree Program

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Abstract

From 2011 to 2017 surveys were given to current students and recent alumni of the master's degree program as well as alumni employers. The surveys were designed to assess any difference in perceptions of how well the program of study prepared students for futures in project management. A survey strategy was developed to assess three respondent groups: students prior to graduation from the program, program graduates one year later, and the employers of graduates one year after graduation. A series of two-tailed independent t-tests at the .05 significance level were performed to determine any statistically significant differences between the mean responses to each question for the compared groups. Survey analysis shows a positive perception of the graduate program by current students, recent alumni and their employers. Lessons learned and best practices for the program assessment are discussed and ideas for comparing this program to other similar programs are presented.

Keywords

Graduate program assessment; Surveys; Pre and post-graduation evaluation

Introduction

Faculty in the School of Engineering were interested in collecting information that could be used to assess the perceived effectiveness of a graduate degree program. Specifically there was strong interest in gathering feedback from current students, recent program graduates and their employers. From 2011 to 2017 surveys were administered to determine group perceptions of how well the program of study prepared students for futures in project management[1]. A survey strategy was employed to assess students' perceptions prior to graduation from the program and again one year later. Similar surveys were also sent to each student's employer one year after the student's graduation from the program to determine the employer's perceptions of how well the program prepared the student to perform as project managers in their organizations. Each year results of the student and employer surveys were analyzed by the faculty to determine perceived effectiveness and to determine if any content or program changes should be made. This enabled the voice of the customer(s) to be collected, reviewed, and incorporated into a continuing improvement process.

Survey Design

The master's degree program is designed to incorporate the latest theory and practice in the field of project management. As the vast majority of students are working professionals, the goal is to provide students with current project management best known practice based knowledge that is

immediately applicable to their current employment. In other words, each class endeavors to provide each student with some knowledge, skill, or ability that can be applied the next day in his/her work.

In our research we were interested in assessing the effectiveness of how well our program prepared students to be project managers based on three perspectives, the graduating students, the program graduates after one year of experience, and their employer one year after graduation. In designing our survey instrument we took into account traditional concerns, such as the quality of the instructional materials, lectures, assignments and exams, but more importantly we designed the survey to assess the practicality and applicability of the course content as it is related to the area of project management.

In developing the survey we attempted to map performance specifications to requirements, using the framework presented in Techniques for Assessing Course-Related Knowledge & Skills[2]. The following course assessment techniques (CATS) were mapped to the Survey Questions (SQ) and learning objectives.

1. Assessing Prior Knowledge, Recall, and Understanding. The CATS in this group focus on analysis—the breaking down of information, questions, or problems to facilitate understanding and problem solving. => SQ[1]
2. Assessing Skill in Synthesis and Creative Thinking. The CATS in this group focus on synthesis—each stimulate the student to create, and allow the faculty to assess, original intellectual products that result from a synthesis of course content and the students' intelligence, judgment, knowledge, and skills. => SQ[2, 6]
3. Assessing Skill in Problem Solving. The CATS in this group focus on problem solving skills of various kinds—recognition of types of problems, determining principles and techniques to solve, perceiving similarities of problem features and ability to reflect and then alter solution strategies. => SQ[1, 2, 7]
4. Assessing Skill in Application and Performance. The CATS in this group focus on students' abilities to apply important—sometimes referenced as conditional knowledge— knowing when and where to apply knowledge. => SQ[4, 5]
5. Assessing Students' Self-Awareness as Learners. The CATS in this group are recommended to help students express personal goals and clarify self-concept in order to make a connection between the articulated goals and those of the course. => SQ[3]

The three survey instruments administered between 2011 and 2017 used a five point Likert scale to obtain a numerical score of perceived program effectiveness (with 5 representing "strongly agree," 4 representing "agree," 3 as "neutral," 2 representing "disagree," and 1 representing "strongly disagree"). Each of the three surveys utilized the following seven questions.

Graduate Exit Survey Questions

1. I am able to apply proper methods to evaluate data to select and initiate a project.
2. I am able to analyze given conditions to create a formal and comprehensive project plan.
3. I take responsibility and apply proven techniques to lead personnel, manage resources, and communicate with stakeholders to execute and control a project.
4. I can obtain acceptance of deliverables; and analyze, evaluate, and complete all financial and administrative documentation (within my assigned responsibilities) necessary to close a project.

5. I consistently practice integrity and professionalism while adhering to legal and ethical standards.
6. I have effective oral, written, and personal communication skills.
7. I demonstrate well developed leadership skills to lead and manage project teams.

Alumni 1-Year Survey Questions

1. I can apply proper methods for the selection and initiation of projects.
2. I am able to analyze given conditions to prepare a formal and comprehensive project plan.
3. I take responsibility to lead personnel, manage resources, and communicate with stakeholders to execute and control a project.
4. I can obtain acceptance of deliverables and complete all financial and administrative documentation necessary (within my assigned responsibilities) to close a project.
5. I consistently demonstrate integrity and professionalism while adhering to legal and ethical standards.
6. I have effective oral, written, and personal communication skills.
7. I demonstrate well-developed leadership skills to lead and manage project teams.

Employer 1-Year Survey Questions

1. Employee applies proper methods for the selection and initiation of projects.
2. Employee is able to analyze given conditions to prepare a formal and comprehensive project plan.
3. Employee takes responsibility to lead personnel, manage resources, and communicate with stakeholders to execute and control a project.
4. Employee can obtain acceptance of deliverables and complete all financial and administrative documentation (within assigned responsibilities) necessary to close a project.
5. Employee consistently demonstrates integrity and professionalism while adhering to legal and ethical standards.
6. Employee has effective oral, written, and personal communication skills.
7. Employee demonstrates well-developed leadership skills to lead and manage project teams.

Survey Methodology and Analysis

In our analysis we investigate the following questions:

1. Do current students have a favorable perception of how well the program prepares them for careers in project management?
2. Is there a difference in perceived program effectiveness when comparing survey results of current students and alumni who had been working in the field for one year?
3. Is there a difference in perceived program effectiveness when comparing survey results for alumni who had been working in the field for one year and their employers?

For each group of surveys a five point Likert scale was used to obtain a numerical score of perceived program effectiveness for each question. From the individual question responses we calculated the overall average response score for each survey. To test the first research question

we used the survey to obtain a numerical score of perceived program effectiveness [3]. To test our second and third research questions we developed the following hypothesis. The Null hypothesis for both questions is formally stated as: the means from the two groups are equal: $H_0: u_1 = u_2$. Alternatively, the means from the two groups are not equal: $H_A: u_1 \neq u_2$. We conducted two-tailed independent t-tests at the 0.05 significance level to determine whether there was a statistically significant difference between the mean survey responses between students and alumni[3, 4]. The survey size, mean response scores, and P-values for the t-test of exiting students and alumni are displayed in Table 1.

Table 1. Student and Alumni Survey Results.

Year	Survey Size Students/Alumni	Exit Survey Mean Score	Alumni Survey Mean Score	P Value
2017-2016	19/25	4.8143	4.6714	0.0961
2016-2015	26/16	4.7314	4.7000	0.7017
2015-2014	39/20	4.8000	4.6857	0.2206
2014-2013	23/17	4.7571	4.7286	0.7375
2013-2012	25/12	4.7286	4.5714	0.101
2012-2011	7/11	4.6114	4.5671	0.7249

A two-tailed independent t-tests was conducted at the 0.05 significance level to determine if there was a statistically significant difference between the overall mean responses for alumni and employers. The survey size, mean response scores, and P-values for the t-test of Alumni and Employers are displayed in Table 2.

Table 2. Alumni and Employer Survey Results.

Year	Survey Size Alumni/Employer	Alumni Survey Mean Score	Employer Survey Mean Score	P Value
2017-2016	25/17	4.6714	4.7571	0.2046
2016-2015	16/8	4.7000	4.9857	0.0007
2015-2014	20/13	4.6857	4.6143	0.5239
2014-2013	17/12	4.7286	4.6857	0.6438
2013-2012	12/9	4.5714	4.7143	0.1800
2012-2011	11/11	4.5671	4.3957	0.1209

Results

For the first research question, the average survey response range was 4.3957 to 4.9857 (Agree and Strongly Agree). For the second research question, the P-values obtained from the t-tests at the 0.05 level of significance support the null hypothesis that there is no statistically significant

difference in the mean survey results when comparing current student and alumni perceptions. For the third research question, five of the six the P values obtained from the t tests at the 0.05 level of significance support the null hypothesis that there is no statistically significant difference in the mean survey results when comparing exiting student and alumni perceptions. The P value for 2016 survey responses is statistically significant, supporting the alternative hypothesis that there is a difference in perceptions. The average absolute difference in scores between the two groups is 2.67%.

Summary and Conclusions

Results of our analysis support the hypotheses that the program is perceived by the students, alumni and employers surveyed as adequately preparing graduate students for careers in project management. It is interesting to note that comparison of the 2016 response data shows employer responses were approximately 16% higher than that of the alumni. The 2016 survey did receive the lowest employer response rate, only half the number of alumni responses, which could have an effect on the results.

The analysis of the survey results show the degree program is well received and is perceived as being effective in preparing students for careers in project management. Anecdotally, instructors have heard from many students and employers that the program provides substantial value through knowledge of the tools, techniques and systematic approaches to management provided by the program. Many alumni stated they feel that these skills and knowledge help to distinguish themselves from their peers. Comments from employers were also very positive regarding our graduates. One difficulty of employing the survey is the amount of effort it takes to obtain adequate response rates from alumni and employers. Multiple contacts and follow ups were often required to obtain adequate response rates. Survey results are annually reviewed to assess the effectiveness of the program in preparing students to become project managers. We feel the survey is a valuable tool to assess program strengths and weaknesses and it provides a means to perform program evaluation and gain needed input for future improvement. We intend to continue using this survey assessment in the future and are recommending its use in other programs within the school.

References

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