

Survey of Undergraduate Construction Programs Use of AC Exam as an Assessment Tool

Abstract

This paper investigates the use of the American Institute of Constructors Associate Constructor (AC) exam as an assessment tool in American Council for Construction Education accredited four year construction management programs in the United States of America. The need for assessment is addressed as well as the means for assessing using various professional exams in academic programs. A survey was developed and distributed electronically with a 63% response rate. The results, use of AC exam including incentives, are discussed and future work suggested.

Keywords: Assessment, Professional Certification, Construction, Education, Survey

1. Introduction

Similarly to the Fundamentals of Engineering exam, the American Institute of Constructors Associate Constructor (AC) exam is taken by students during their senior year of a construction management bachelor's degree program. It is considered the first level for certification towards becoming a Certified Professional Constructor. It is often utilized by university construction programs as an assessment tool, providing insight into the effectiveness of course curriculum and instruction. The eight hour AC exam covers the following subject categories and is weighted by percentage of total exam as shown in Table 1.

Table 1: AC exam categories and weights

<i>I. COMMUNICATION SKILLS</i>	<i>5.5%</i>
<i>II. ENGINEERING CONCEPTS</i>	<i>9%</i>
<i>III. MANAGEMENT CONCEPTS</i>	<i>4%</i>
<i>IV. MATERIALS, METHODS, AND PLAN READING</i>	<i>10%</i>
<i>V. BIDDING AND ESTIMATING</i>	<i>17%</i>
<i>VI. BUDGETING, COSTS, AND COST CONTROL</i>	<i>10.5%</i>
<i>VII. PLANNING, SCHEDULING, AND CONTROL</i>	<i>16.5%</i>
<i>VIII. CONSTRUCTION SAFETY</i>	<i>7%</i>
<i>IX. SURVEYING AND PROJECT LAYOUT</i>	<i>2%</i>
<i>X. PROJECT ADMINISTRATION</i>	<i>18.5%</i>

At the author's university the AC exam has been used as an assessment tool for nearly 10 years. The perception was that an established standard exam would bring benefits to students and construction industry. However student interest has faded resulting in poor preparation, commitment, and thus performance. Further, a recent survey (Bruce et al, 2008) conducted among industry practitioners and construction educators reveals mixed results regarding the value of the AC exams: "This study set out to provide empirical data in regards to the value of certification to Certified Professional Constructor (CPC) construction educators and industry practitioners. Results indicated that certification had little impact on both group's perceived increased ability to do their job, increased professional opportunities, increased salary, increased promotion opportunities, and increased job responsibilities. However, certification did have an impact on both groups' prestige within and outside their organizations. Similarly over 40% of all respondents felt that the certification increased their knowledge and confidence as a construction professional."

Consequently enhancement of existing methods or other alternatives for assessment are being considered. To assist in identification of assessment methods, an inquiry with peer programs will provide a context in order to exercise options involving the AC exam.

2. Methodology

In order to get an overview of existing construction management programs' means of assessment, a survey was developed by asking 28 accredited programs chosen at random to answer the following four questions to gauge the use of the AC exam. An additional question was asked regarding determination of the survey population.

1. Is your school using the AC exam as a tool for assessment?
2. Is it required of all students?
3. Is it optional?
4. Any comments?
and How do you determine your survey population?

A response was received from 22 of the surveyed programs, a response of 79%. Of the respondents, 18% give the exam as an option, 54% require taking the exam, and 59% use the exam as an assessment tool. The response from the initial survey led to the consideration of a revised set of survey questions. The revised survey was distributed via email to all American Council for Construction Education (ACCE) accredited four year construction management (CMGT) programs in the United States of America. Of the 66 CMGT programs, 64 were successfully contacted and 41 completed surveys were received, a national response rate of 64%. The revised set of five questions was as follows.

1. Is the AC exam offered in your program?
2. Is it required that all students take the exam, or is it optional?
3. If your program offers the exam are there any incentives to encourage taking and passing the exam?
4. Is your program using the AC exam as a tool for assessment?
5. If the exam is not used for assessment, what does your program use?

3. Results

The following response tables and additional comments summarize the survey data received. Table 2 states the number of respondents and the corresponding percentage for their answers to the first question of the survey.

Table 2: Survey response rate

		YES	NO	TOTAL
<i>Is the AC exam offered in your program?</i>	<i>Count</i>	35	6	41
	<i>Percent</i>	85	15	100

<i>Is it required that all students take the exam?</i>	<i>Count</i>	22	19	41
	<i>Percent</i>	54	46	100
<i>Are students required to pass exam?</i>	<i>Count</i>	5	36	41
	<i>Percent</i>	12	88	100
<i>Are students incentivized?</i>	<i>Count</i>	21	20	41
	<i>Percent</i>	51	49	100
<i>Is your program using the AC exam as a tool for assessment?</i>	<i>Count</i>	28	13	41
	<i>Percent</i>	68	32	100

The following additional comments were offered by respondents that added further detail to ways they incentivize students.

- Students are required to get a 192 of 300 to pass the senior experience class.
- Have to score at least 60% to graduate from the program; the exam is a part of a senior level course.
- Passing the exam (70% or greater) required for graduation.
- Used as the Final Exam for Capstone Course – 40% minimum on the AC Exam required to pass the course.
- If students pass the exam they (*do not*) have to take the final. If they fail the exam they have to take a final exam in the class that is composed of questions taken from AC exams.
- University pays exam fee for students who pass exam.
- It is counted as a part of the capstone course grade.
- Part of the Senior capstone grade.
- AGC chapter pays half the fee.
- Counts as exam score in one of the program's courses.
- Five (5) overall points added to the Capstone grade.
- Tied to a grade item in the final senior semester management of construction course.
- Part of Capstone; makes a letter grade difference if not passing. If they had an "A" and failed, the "A" becomes a "B".
- The exam is paid for if the student passes the exam.
- Capstone course; if student takes the exam the test result comprises 50% of the grade.
- Yes; industry Advisory Council pays \$75 of the fee for the first 40 students that sign up to take the exam each semester.
- Yes; reimburse cost of exam if student passes.

- Pay one-half the cost of those taking the exam.
- Students who take the exam do not have to take the final exam in the Capstone course; also provide a 50% rebate (scholarship) to students who pass the exam.
- Seniors are encouraged to take the exam; if they pass they have the option to take their AC score, to which 15% is added, and apply it to the Capstone final exam.
- Encouraged but no incentives offered at this time.

For those 13 programs shown that do not use the AC exam for assessment provided the following comments as requested in survey question five.

- Class work and grades
- Follow ACCE standards
- Use an exit survey, university wide alumni survey that allows to add CM specific questions, and an employer's survey
- A comprehensive Capstone project provides assessment
- Use course assessment tools for evaluating program
- Use Building Thesis class and several other survey type measurements
- Use individual Capstone projects in which each student must demonstrate his/her proficiency in estimating, scheduling, safety, and project planning
- Have own internal tools for assessment
- Gather industry feedback and input at different venues, including career fair questionnaire and Capstone presentations to industry and collecting feedback
- Exit interview, alumni surveys; input from our industry Advisory Council; student coursework
- Have about 40 different indicators used for assessment
- Senior exit surveys; 2 year out alumni surveys; 5 year out alumni surveys; employer surveys, Advisory Council input

4. Discussion

This study sought to gain insight into the use of the exam by peer programs. The survey shows 85% of the responding construction programs offer the AC exam and 54% require their students take the AC exam. Half of these programs do offer incentives to the students to pass the exam. These incentives include a certain score to graduate or pass a class, counts as a portion of a class grade, bonus points to class grade, replacement for final exam, and payment of test fees. Other means of assessment mentioned included exit surveys, capstone projects, graded class work, and internal tools. Future work includes identifying correlation between program pass rates and the obtained survey data. Also demographics information, including regional bias, is of interest. Further inquiry including additional programs and questions could provide a broader perspective on the AC exam.

5. References

Bruce, R. D., Sauer, A. D., and McCandless, D. W. (2008). "Comparing the Impact of the Certified Professional Constructor (CPC) Credential on the Careers of Construction Educators and Industry Practitioners." ASC Proceedings of the 44th Annual Conference, Associated Schools of Construction, Auburn, Alabama.

<http://www.professionalconstructor.org/PROFESSIONALCONSTRUCTOR/PROFESSIONALCONSTRUCTOR/Go.aspx?c=BlogViewer&BlogKey=dc240781-3ff7-4334-b799-b9f47457ce72>