

Student Perceptions about Their Participation in the ASC Regions 6 and 7 Student Competition

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The perceptions and expectations of Construction Management students about the benefits and drawbacks of participating in a major student competition are discussed in this paper. The students were surveyed immediately before and immediately after competing in the ASC Regions 6 and 7 Annual Student Competition. The surveys explored original motivations and views, as well as changes in original perceptions after the competition experience. Student responses point to significant improvement in the confidence of each individual's academic skills and a change of motivating priorities. While improving employability was a major drive for participation, other aspects such as the challenge to win the event and social connections were also of considerable importance. The student views and perceptions discussed here can be used for the academic leveraging of competitions as pedagogical tools, and the improvement of this and other similar competitions. A Discussion and Conclusions section addresses these findings and discusses their significance.

Key Words: Student competitions, undergraduate education, pedagogy.

Introduction

Student competitions offer participants the opportunity of working in a challenging task in a collaborative manner. These events emphasize the four areas of primary importance for effective learning in a college setting: social interconnection, motivation, cognitive elaboration and opportunity to practice (Ravenscroft et al., 1999, Senior, 1998). They also frequently offer other advantages to participants such as enhancing the prospects for future employment and prestige among their peers. Student competitions have been popular among Construction Management (CM) programs, which offer students the opportunity of participating in these events as an extracurricular activity. The Associated Schools of Construction (ASC) hosts competitions for all of its seven regions, with a substantial number of students participating in each one. Most professional and trade associations related to engineering and CM also offer some type of student competition, including the Design Build Institute of America (DBIA), the Associated Builders and Contractors (ABC), and the National Association of Home Builders (NAHB). Moreover, the American Society of Civil Engineers (ASCE) hosts an annual National Concrete Canoe Competition (Cramer and Kurten, 2005); the American Association of Mechanical Engineers (ASME) offers the Human Powered Vehicle Challenge and the Student Robot Design Competition (Gershenson, 2006), among many other examples.

Studies concerning student competitions have been centered on the opinion of faculty advisors (Wankat, 2005) or recommendations from personal experience (Schuster et al. 2006, Sepahpour and Chang, 2005), with a very limited number of instances where direct feedback from participant students has been sought (e.g., Burguillo, 2010). As a result, competition design, administration and advertising to students frequently do not benefit from the experience and viewpoints of their most direct participants.

Objective and Methods

This paper summarizes the results of a study addressing the perceptions and change in perceptions experienced by students from a mid-West CM four-year college program as they participated in a large student competition. The study had the objective of improving the understanding of motives and concerns of these students in issues of relevance to the improvement of student competitions and CM education. Specifically, this study can benefit CM education in several significant areas: (1) the design and administration of hands-on activities, (2) the quality of current and future student competitions in establishing fair expectations from potential student participants about the benefits and challenges of competing in these events, and (3) the quality and improvement of existing CM courses to better prepare students for competitions and employment.

Two questionnaires were used as main instruments for the study. Both included multiple-choice questions on a Likert scale and an open-ended question section. The before-competition questionnaire concentrated on student expectations about the competition, and also included questions about the respondent's point in their studies at Colorado State University and perceived mastery of key academic subjects. The after-competition questionnaire explored changes in perceived mastery of the same subjects and reactions to the competition experience.

The two questionnaires were administered to 40 students from a total of 61 participating in the competition. Responses were anonymous. Pairing responses was made possible by numbering the pre-competition questionnaire, and attaching to it a sticky note with the same number. Participants kept this note and then wrote this number on the post-competition questionnaire. Responses were analyzed by identifying and quantifying the frequency of recurring themes in the open questions. This research is exploratory in nature, since the number of surveyed students is small and limits the generalizability of its analysis and conclusions.

Overview of the ASC Regions 6 and 7 Student Competition

A typical CM student competition involves teams from several CM programs which are confronted with a challenging applied problem involving the design, construction, or administration of an actual project. The details vary among competition hosts. Many competitions include an oral presentation to judges acquainted with the actual solution implemented. The judges typically worked on the actual project in some administrative capacity (both for its general contractor or specialty contractors) and are familiar with all aspects of the project chosen for the competition. Some are stand-alone while others are part of a large meeting of the sponsoring institution. The competitions can have multiple legs, first at a regional level followed by a national level competition with the regional winning teams.

The annual student competition attended by the students surveyed here is representative of the structure and procedures of other CM competitions. The competition attended by the surveyed teams is jointly hosted by Regions 6 and 7 of the ASC, and is the largest in the area of CM. It is attended by close to a thousand students and hundreds of faculty members and industry sponsors. The regions include Construction Management programs concentrated in the Rocky Mountain (Region 6) and the West Coast (Region 7). The competition consists of four regional problem categories repeated for each of the two regions, and nine national problem categories. A summary of the attendance from 2001 to 2013 is shown in Figure 1. The figure shows the increasing popularity of the competition, although the number of participating students had a slight drop after peaking in 2010.

The competition rules have varied slightly over the years and each construction company sponsoring a problem has leeway in determining its preferences for some administrative procedures. In general, competing teams of four to six students are given a problem and must develop a written response to the problem on the first day of the competition. The number of teams competing in each category varies between five and thirteen. Each response is orally presented to and discussed with the sponsoring company's judges on the second day. The third day of the event consists of a career fair followed by the announcement of the three top teams in each problem category. Additional awards and recognition are given to students that showed exceptional skills in presenting or other categories. The competition

has been held for more than 20 years, and traditionally takes place at Sparks, a suburb of Reno, Nevada, almost entirely occupying a large hotel in the area.

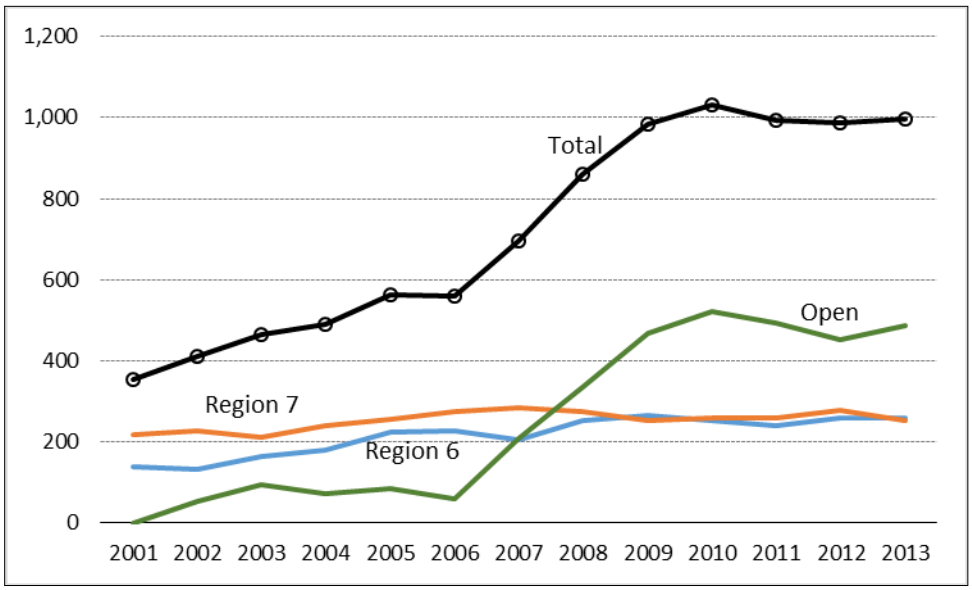

Figure 1. Students participating in the ASC Regions 6 and 7 Annual Student Competition
(L. Brown, personal communication, January 22, 2014)

Each industry sponsor provides an actual project performed by the company to serve as the basis for the problem provided to the competing teams in the sponsored category. In the weeks prior to the competition, each competing team is provided with general information about the project. The bulk of the information is provided on the first morning of the competition. After the problem is discussed and handed out by the sponsor, the teams go to their workrooms and must work without any contact with their advisors or alternates and in most cases without internet access. Many administrative details are left to each problem's industry sponsor, such as its starting time and deadline, written and oral presentation format, and judging rubric. At the end of the oral presentation sessions, the hosting company holds a debriefing of the approach that the company took to perform the project. Problem categories are shown in Figure 2.

The influence of participating and especially winning a category at the competition can be significant and immediate to the careers of students. The preparation for the event involves significant merit, time and effort. Top performers are frequently offered job interviews on the spot by company recruiters attending the event. Teams can prepare for months for the competition. The students surveyed here are selected among many applicants, oftentimes canvassed by students with experience in the ASC or similar competitions. As part of their preparation, teams usually make presentations to local companies which set up problems mimicking the ASC competition. This creates an additional opportunity for students to interact with the industry they are going into as well as providing the industry with the opportunity to view their prospective employees at an early stage under "real life" conditions.

Open Problems
Alternates Competition
Concrete Solutions
Determining Project Risk
Electrical
Integrated Project
Marine
Mechanical
Preconstruction Services
Sustainable Building & LEED
Virtual Design and Construction
Regional Problems
Commercial Building
Design Build
Heavy Civil
Mixed Use

Figure 2. Categories and Problems for the ASC Regions 6 and 7 Annual Student Competition

In the case of the CM program surveyed for this study, company donations to the program are used to cover expenses for students and their faculty advisor. This allows the students the ability to concentrate on preparing for the competitions rather than fund raising.

Discussion of Results

Perceived skill levels

Two major objectives of the study consisted of assessing the confidence level that students had regarding their own academic competence, and probing whether these perceptions were different after the competition. Students were asked to self-assess their skill level on the academic areas presented in Figure 3 immediately before participating in the competition. The Likert scale used 5 to signify "Excellent", and 1 for "Much below average". Responses ranged from 2.57 to 4.14, with an average of 3.58, showing a nuanced awareness of differences among their skills in difference academic areas. The questions were repeated in the questionnaire administered immediately after the competition. As shown in Figure 3, the overall perceived level increased by 10.9%, with responses ranging from 3.42 to 4.30 and an average of 3.96. Averages improved in each individual academic area from 1.0% to 28.4%. Moreover, the improvement in the after-competition survey was inversely proportional to the skill level reported on the before-competition survey, with a high Pearson's correlation coefficient of -0.954.

A question asked "How much do you expect that your participation in the competition (will improve) / (improved) your knowledge?" (Verb tense differed between the before- and the after-competition surveys to account for the timing) with choices between 5 to signify "very substantial" and 1 for "minimum". The average response to this question was almost identical in both surveys (4.47/4.44), with a decline of less than 1% from the before-competition survey to the after-competition survey. The question "Would you participate again in the competition?" was included in the after-competition survey, and had an average response of 4.65/5.00.

	Avg. Before Competition	Avg. After Competition	Change, Absolute Pts	Change, Percentage
a.Performing tasks for preconstruction	3.73	4.06	0.33	8.5%
b.Performing a quantity takeoff	4.05	4.09	0.04	1.0%
c. Estimating a project	3.82	3.94	0.12	3.1%
d. Scheduling a project	2.57	3.42	0.85	28.4%
e. Understanding specialty work	3.19	3.73	0.54	15.6%
f. Making an oral presentation	4.14	4.30	0.16	3.8%
g. Responding to an RFP	3.55	4.18	0.63	16.3%
Average a - g	3.58	3.96	0.38	10.9%

Figure 3. Analysis of responses to the question
"How would you consider your knowledge on the following areas?"

Responses to open-ended questions

The two surveys examined here included open-ended questions seeking insight about details difficult to convey in numerical responses. Figure 4 shows a summary of key issues identified in response to the question "What are the most important reasons that led you to join a competition team?" This was included in the survey administered before the competition. Most responses covered more than one reason, with the most common consisting of experience, improved knowledge, and improved employability. A parallel line of comments concerned the high exposure to industry recruiters. When the two latter reasons are added to the overall issue of improving employability, more than half of the sampled students singled out a job-seeking reason for participating in the competition. Other frequently mentioned reasons include the desire for networking and participation and challenging oneself. Additional reasons for joining a competing team were also pointed out, including the opportunity for improving skills on a given subject, enhancing their visibility to the hosting companies ("set myself apart from my peers", "looks good on a resume"), or simply having a good time.

Reason	Times mentioned
Experience	8
Learning and/or more knowledge	8
Employability	7
Industry exposure	5
Challenge	4
Networking and participation	4
Specific skill	2
Setting oneself apart	2
Fun	2
Presentation	1
Career fair	1

Figure 4. Responses to the question "What are the most important reasons that led you to join a competition team?"

Figure 5 shows a summary of frequency for key issues to the question "Why would you participate or not participate in the competition again?" included in the after-competition survey. All responses to this open-ended question were positive. Six comments mentioned that the respondent could not return because they would graduate in the coming year. Graduating participants had some of the most positive comments about the experience. A comment reflecting this enthusiasm was "I graduate in May, however, if I was not graduating, I would do the competition again for the experience, the industry exposure, and a chance to win."

The most mentioned reasons on the before-competition questionnaire are also most frequently pointed out on the after-competition follow-up, namely the learning and knowledge acquired from the event, and the competition as experience. The importance of personal enjoyment at the competition is barely included in the before survey, but it is among the most frequently mentioned motives for wanting to come again to the competition. The competitive challenge offered by the experience was also among the most frequently mentioned reasons for wanting to repeat the experience. Examples of student comments include "I would do it for the challenge", "we can place in the top 3" and "I would do the competition again for the experience, the industry exposure and a chance to win". The competition is described in several remarks as "stressful", "very exhausting" and "grueling". These terms are applied in a positive context, as part of the overall experience.

Reason	Times mentioned
Good experience	9
Fun	8
Learning and/or more knowledge	7
Competing / challenge	5
Industry exposure	4
Grueling / exhausting experience	3
Networking / participation	3
Real world experience	2
Presentation	2
Employability	0
Cannot repeat because of graduation	6

Figure 5. Responses to the question "Why would you participate or not participate in the competition again?"

Employability is not mentioned explicitly as a reason for repeating participation on the after-competition survey, but the roughly equivalent point of industry exposure is mentioned four times. Other issues addressed in the responses are the real-world experience of solving the problem, the willingness to participate "just for the experience and the [oral] presentation", and the networking opportunities offered by the competition.

Conclusions

CM student competitions are important to participating students in many aspects including an enhanced view of their own academic skills, social connections, employability and enthusiasm towards their profession. These outcomes are in close alignment with ASC's mission, part of which is "fostering excellence in construction communication, scholarship, research, education, and practice." (ASC Mission statement, 2013).

Given all the benefits offered by student competitions, it is remarkable that the great majority of studies about student competitions in general and specifically about those in CM have not explored the direct opinion of participant students. The study discussed in this paper is relevant in part because it constitutes an exception instead of the rule by seeking feedback from the competing students, who are in the best position to describe their opinions before and after the event.

Among key results, it was found that students had nuanced perceptions of their abilities in diverse academic areas. The after competition survey showed that students' self-perceived skill levels were higher in all areas, suggesting that their participation in the event increased their self-confidence. The factors influencing the reasons for participating in the competition changed in importance compared to the parallel question of intention to participate again in it. These changes showed an emphasis in social aspects such as the challenge of competing and the quality of the overall experience, in contrast to the initial importance given to more tangible benefits such as academic learning and employability.

These results are significant for several aspects of CM education. The energy from participating in the competition, along with the excellent opinions expressed by students about the event can be used for recruitment purposes. More significantly, these results show the possibilities offered by competitions as pedagogical tools. For example, one of the authors has developed a popular capstone course following the format of a CM student competition. The competition format provides as close to "real life" situations as possible in a class room setting. Other courses in the same program are attempting similar competitive activities with a short timeframe and well defined rules and winners.

From an industry recognition perspective it has proven to be a valuable marketing tool. Some companies take several recruiters from their firms to the competitions in order to select future employees. Industry representatives have commented that these students not only show a willingness to put forth extra effort but are sought after because they "hit the ground running when they are hired". This is especially beneficial to companies because they can "interview" hundreds of students in one day by watching them compete in very real life scenarios. The survey indicates the students are aware of this benefit and pursue positions on competing teams to enhance their hire ability.

This research will be followed up by surveying a wider student sample and seeking further analysis of the results obtained here. Important issues to include are (1) the influence of the opinion of students who have previously participated in the competition on the perceptions held by their teammates attending it for the first time, and (2) the influence of industry sponsors on student perceptions. The next competition cycle (2014) is intended to be used for this expanded study.

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