

CIOB Global Student Challenge – Evaluation of Virtual and International Competitions Aimed at the Construction Management Curriculum

Nicklaus Wilcots, AC
California Polytechnic State University
San Luis Obispo, California

Each year the Chartered Institute of Building hosts a six-week virtual competition called the Global Student Challenge. Three Cal Poly Construction Management students and myself competed in this competition. This challenge was an international competition that gave students the ability to manage their own construction company. This competition is the gateway to enhancing higher-level education through academic competitions. Students competitions, such as the ASC competitions, have been shown to improve academic success as Cal Poly's Learn by Doing methodology is utilized. However, the largest flaw with academic competitions is the negative impact on classes outside of construction management. The purpose of this project is to incorporate more international and more virtual academic competitions into the Construction Management curriculum. A literary review as well as a survey was conducted to analyze student interest and assess the pros and cons of academic competitions, as well as the virtual and international applications. After a thorough investigation it is shown that students and professionals believe a virtual competition and an international competition will be beneficial not only to a student's education but to their career paths as well.

Keywords: academic competitions, international competitions, virtual simulations, student success, Cal Poly Construction Management Department

Introduction

The Construction Management Department at California Polytechnic State University San Luis Obispo has created an educational program that has seen success for many years. Not only do many students graduate with honors, but for the past few years 100% of students have found a major-related job prior to graduation. The student success is credited to the department as the department focuses on many different aspects of the construction industry including estimating, scheduling, MEP systems, communication skills, safety, ethical procedures, documentation, project delivery methods, risk management, jobsite activities, construction accounting, construction law, sustainable construction, structural behavior, quality control, quality assurance, and much more. In addition, the Construction Management Department at Cal Poly focuses heavily on student academic competitions. Specifically, the Associated Schools of Construction (ASC) academic competitions. Every year Cal Poly sends multiple teams to the Region 3, Region 6, and Region 7 ASC academic competitions located in Downers Grove, Illinois and Reno, Nevada. Cal Poly construction management students are generally very successful in these

competitions. For example, during the 2018-2019 academic school year Cal Poly took home seven first place trophies and two third place trophies in 17 different competitions. This is more than triple of any other university. These competitions are beneficial to students as they do not only create networking events for students, but they also develop lifelong skills that cannot be obtained in a classroom (Daval, Mello, and Schuster, 2006, p. 3).

While these countrywide academic competitions have shown to produce many positive benefits for students, the realm of virtual and international competitions have yet to be encountered on the educational scale. The purpose of this research paper is to incorporate a virtual international student competition into the construction management curriculum at Cal Poly San Luis Obispo.

Virtual Academic Competitions

The construction management students at Cal Poly are highly encouraged to pursue academic competitions during their time at Cal Poly. These competitions not only test a student's ability but also challenges them to think critically and collaborate with their colleagues. However, there is only a limited number of spots available for students. As the Construction Management Department continues to considerably grow, as it has in the past few years, these competitions become more exclusive and many students will not be able to reap the benefits. Yet, introducing a virtual or an international competition into the Cal Poly community will allow more students to compete in competitions. Not only will more students be allowed to compete, but research has shown that virtual simulations have a positive impact on students' long-term learning. Professor Korman and Johnston (2006) have shown that simulations provide a means for active learning that will lead to longer-term recall, problem solving, and synthesis skills more so than the traditional classroom learning style (p. 2). Korman and Johnston continue to discuss how students perfect new skills by actively participating in different procedures that test their abilities and are able to reflect on their experiences. This is true of virtual competitions as a different array of competitions are available and these competitions can test students in order to continue facilitating their education. In addition, it is shown that virtual competitions come natural to this generation of students. The millennial and younger generation of students underwent a childhood with computers and video games at their disposal. Many students have spent countless hours staring at a screen trying to obtain a fictional goal. As a result, the transition into virtual academic competitions will be natural and will facilitate efficient and quality learning (Korman and Johnston pg 1).

Chartered Institute of Building Global Student Challenge

From January 2019 through April 2019 three other Cal Poly Construction Management students and myself competed in the Chartered Institute of Building's Global Student Challenge (CIOB GSC). These students were Emmanuel Gonzalez, George King, and Jacob Navarre. The CIOB GSC consisted of a team of four students running their own virtual construction company over six weeks. The challenge operated with MERIT (Management Enterprise Risk Innovation and Teamwork), a game that simulates a construction company. The CIOB GSC is divided into three sections which are the Foundation Years, the Early Years, and the Final Rounds. The Foundation years is considered the practice round. During this phase teams become familiar with the computer software and are able to prepare tactics and test different strategies. It is approximately

six and a half weeks. Furthermore, the Early Years is the six-week competition where you compete against teams across the globe based upon your strategies. Throughout the competition teams make decisions that influence the success of their company. Each team member is assigned a different role:

Construction Manager – Jacob Navarre

The role of the construction manager is to manage the site costs of each job, ensure each site contains the adequate work force needed to prevent the delay of the job and please the client, and effectively utilize laborers and subcontractors between jobsites.

Estimator Manager – Nicklaus Wilcots

The role of the estimating manager is to determine the jobs to cost, determine the amount of man-weeks required to estimate the costs and risks of the jobs, attain the balance of Design-Build and Build-Only jobs based on the team strategy, and determine the complexity of the costing to attain high confidence in the estimates.

Financial Manager – George King

The role of the financial manager is to utilize the company's asset that reflect positively on the company, protect the interests of the shareholders, and monitor the company's investments.

Overheads Manager – Emmanuel Gonzalez

The role of the overheads manager is to set staffing level for the company's departments which include estimating, human resources, marketing, health and safety, and quality, and analyze the market by assessing the market effort, assessing the market size, assessing the potential sectors, and assessing the client relationships.

During the 2019 competition 39 teams from four different continents competed in the GSC. This is the first time Cal Poly competed in this competition and placed 16th. The scoring is based on Key Performance Indicators. These indicators include Client Satisfaction, Company Value, Gross Profit to Turnover, Capital Employed, Operating Profit to Turnover ratio, Forward Margin, and Forward Workload. The decisions that each team makes each period will have positive or negative effects on the key performance indicators which affects the score (CIOB).

Methodology

The methodology for this paper is qualitative in its nature as it is based upon students in the construction management department. A survey was conducted on a group of students at Cal Poly. Prior to the survey, preliminary research was initiated in order to provide background information about national competitions, virtual simulations, international competitions, and the positive and negative impacts these have on students. Educational papers discussing virtual simulations and the effects on students' learning were observed to provide background. In addition, educational papers discussing academic competitions and their effects on students' learning were observed. After the literature review was completed the survey was conducted. The goal of the survey was to analyze student interest and assess the pros and cons of academic competitions. The survey was tailored for students who have competed in academic

competitions or are interested in academic competitions such as the ASC competitions. The survey was comprised of 13 questions. Furthermore, another form of qualitative data gathered is personal experienced as three other Cal Poly construction management students and myself competed in the CIOB GSC competition.

Survey

The survey conducted throughout the Cal Poly construction management student body analyzed the benefits and negatives of academic competitions based off their personal experience and their interested in the competitions. The questions from the survey included:

1. What is your current class level?
2. Have you ever competed in a construction management competition within the United States?
3. Do you believe the competition helped you in any of the following ways?
4. Did a national competition have any negative effect on you as a student?
5. Have you ever competed in an international competition?
6. Do you believe an international competition could benefit you as a construction management student?
7. What kind of benefits do you believe an international competition will have?
8. Did an international competition have any negative effect on you as a student?
9. Do you believe using virtual construction competitions will be beneficial to your success as a construction management student?
10. What kind of virtual construction competitions would you be interested in pursuing?

These questions resulted from a combination of literary background and personal experience. This survey analyzed the student interest in national competitions, the student interest in international competition, and the student interest in virtual simulations. Students were given the option to provide feedback and give their thoughts. Please reference Appendix A for survey results.

Results and Analysis

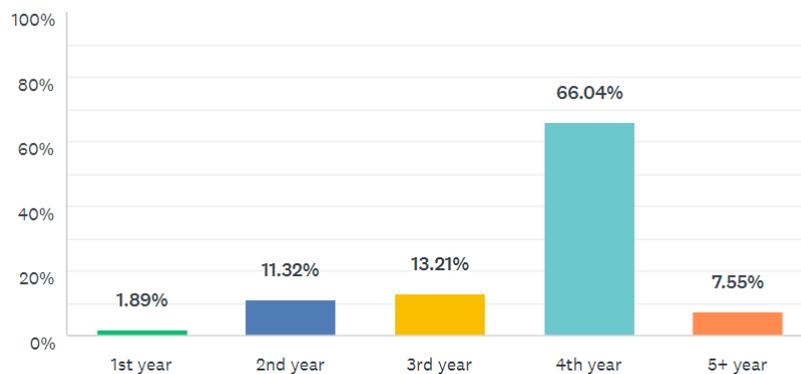


Figure 1: Student Class Level

Results from the study conducted are shown above. This online survey was focused on students in the Construction Management Department at Cal Poly. Please see Figure 1 (above) for the breakdown of students that participated in the anonymous survey.

This information is vital as the students that are interested and students that have competed in academic competitions should have input into this study. This shows the majority of the students that participated in this survey are third, fourth, and fifth year students. This is beneficial as the majority of students that compete in academic competitions are third year and fourth year students. However, many second year students have competed as shadows in academic competitions and few have been placed on a team.

Furthermore, the benefits of academic competition were analyzed based off student experience. The benefits listed below were acquired from experience and the literary review (See Figure 2).

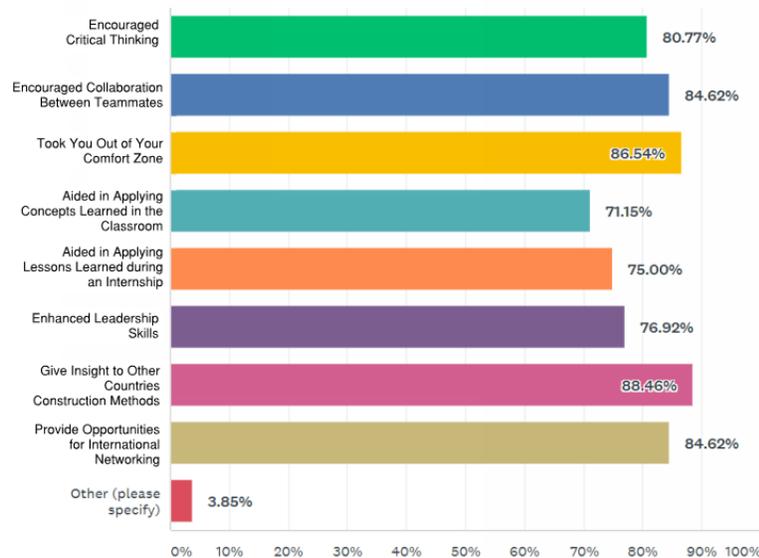


Figure 2: Benefits of Student Competitions

Figure 2 shows the benefits students found while competing in academic competitions. Key benefits included encouraging collaboration between teammates and the opportunity for networking. Not only do these competitions enhance a student's education and their careers, they also push students. As about 87% of the students were taken out of their comfort zone. This is beneficial as encouraging students to take more risks will improve their abilities to foster a better career. In addition, an international competition will allow students to utilize construction methods outside of the United States. This allows comparisons between different construction methods in different countries which will foster innovation.

Moreover, the survey also analyzed the negative results of academic competitions as shown below in Figure 3.

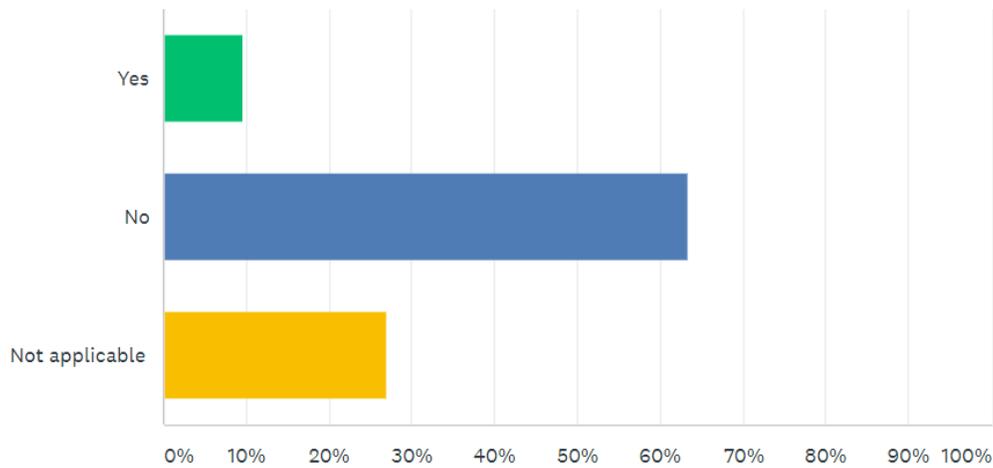


Figure 3: Negative Effects on Students

Students were asked: “Did a national competition have any negative effect on you as a student?” Figure 3 shows the results. While 63.46% of students stated academic competitions did not have any negative effects on them, about 10% of students surveyed stated that academic competitions did have a negative effect on them. Students that faced negatives effects stated that the effects were primarily a downfall in grades. This is a result of a loss of time. Academic competitions such as the ASC competitions require a tremendous amount of a student’s time. As a result, many students are unable to find the time required to succeed in their other classes.

Finally, students’ analyzation of virtual simulations was completed. Students were asked if they believed virtual simulations were beneficial to their success. The results are shown below in Figure 4.

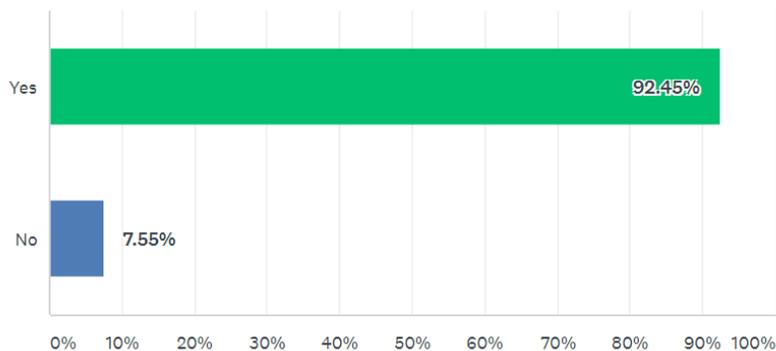


Figure 4: Student Success through Virtual Simulations

Figure 4 shows that over 90% of students believe virtual simulations will be beneficial to their success. As virtual competitions share the same benefits as academic competitions but are completed on the student's time. This allows more flexibility for the student therefore allowing for success in the student's education in addition to success in an academic competition. Figure 5 shows the interests students have in virtual competitions.

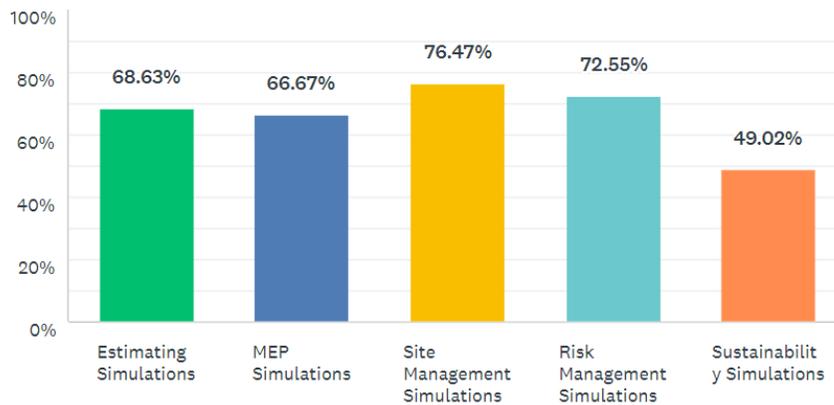


Figure 5: Student Interest in Virtual Competitions

Conclusion

Academic competitions have been utilized to enhance students' education for many years and will continue to for many more years. It is only natural that these competitions continue to innovate much like the construction industry continues to do so. It has been shown that the Construction Management Department at Cal Poly San Luis Obispo can continue to innovate its involvement in academic competitions by incorporating more virtual and international competitions into the curriculum much like the CIOB GSC. Competitions, whether they are national, international, or virtual, bring benefits to students such as encouraging critical thinking, enhancing leadership skills, providing networking opportunities, pushing student limits, and many more. Non-virtual competitions do have negative effects on students, primarily harming student success in secondary classes by eliminating their time availability. As a result, more virtual competitions and simulations can provide the benefits while eliminating the negative effects. This allows students to become successful not only in their education but in their career paths as well.

Further Research

The author's suggestion for further study of the CIOB GSC and the benefits of academic competitions are as follows:

- Compete in the GSC CIOB with an interdisciplinary team, possibly a business major.
- Conduct study with a larger pool of students.
- Conduct study outside of Cal Poly. Survey construction management students in schools that compete in academic competitions.

References

Casensky, M., Korman, T., & Johnston, H. (2015). Using Simulations to Better Train Future and Existing Construction Management Personnel. The University of British Columbia.

CIOB Website, (2019). *Take Part. The Challenge*. URL. <https://gsc.ciob.org/the-challenge/>

Johnston, H. & Korman, T. (2010). Enhancing Construction Management Education through the use of a Virtual Construction Company Simulation System.

Johnston, H. & Korman, T. (2012). Development of Use of a Virtual Construction Company Simulation System for Education. World Proceedings.

Johnston, H. & Korman, T. (2013). Using Game-Based Learning and Simulations to Enhance Engineering and Management Education. IEEE Frontiers in Education Conference (FIE).

Margaretic, I. (2016). An Educational Research Paper on the Integration of Competitive Skills & Knowledge within the CM Curriculum. Digital Commons.

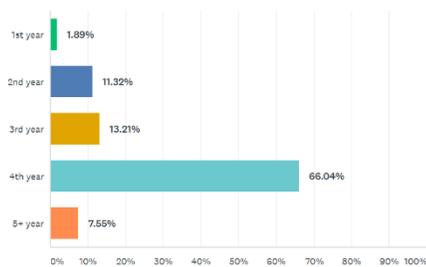
Schuster, P., Davol, A., & Mello, J. (2006). Student Competitions – The Benefits and Challenges. Digital Commons.

Appendix A – Survey Results

Q1

What is your current class level?

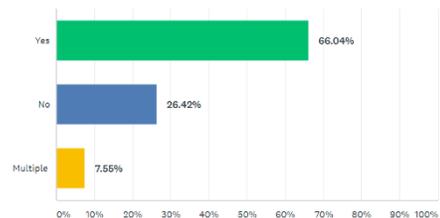
Answered: 53 Skipped: 0



Q2

Have you ever competed in a construction management competition within the United States?

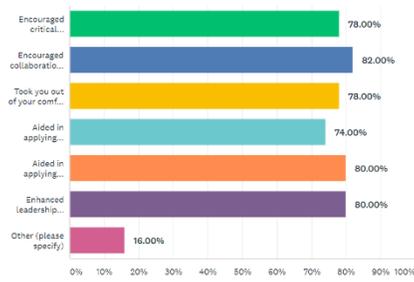
Answered: 53 Skipped: 0



Q3

Do you believe this competition helped you in any of the following ways?

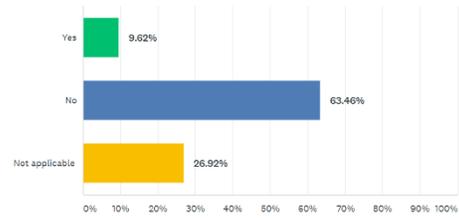
Answered: 50 Skipped: 3



Q4

Did a national competition have any negative effect on you as a student?

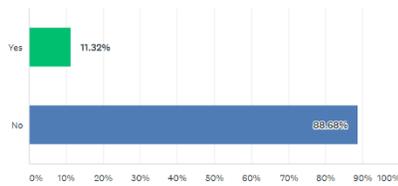
Answered: 52 Skipped: 1



Q5

Have you ever competed in an international competition?

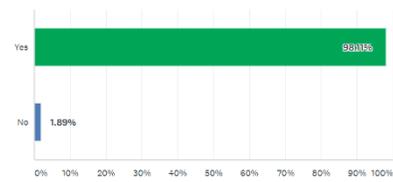
Answered: 53 Skipped: 0



Q6

Do you believe an international competition could benefit you as a construction management student?

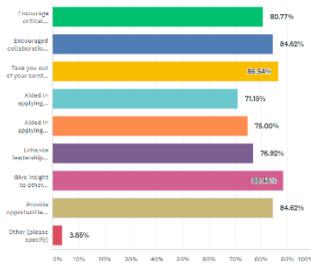
Answered: 53 Skipped: 0



Q7

What kind of benefits do you believe an international competition will have?

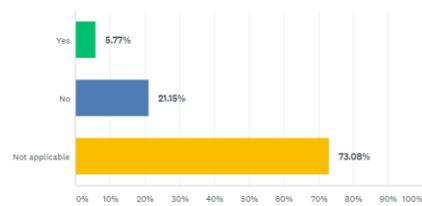
Answered: 52 Skipped: 1



Q8

Did an international competition have any negative effect on you as a student?

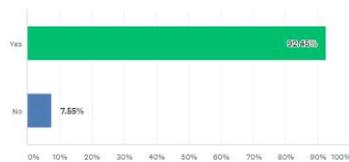
Answered: 52 Skipped: 1



Q9

Do you believe using virtual construction competitions will be beneficial to your success as a construction management student?

Answered: 53 Skipped: 0



Q10

Student Interest in Virtual Simulations

Answered: 51 Skipped: 2

