

# A Case Study on the CIOB Global Student Challenge- Project Overview

**Jacob R. Navarre**

California Polytechnic State University  
San Luis Obispo, CA

An international construction competition called the Chartered Institute of Building (CIOB) Global Student Challenge has been introduced recently and is starting to gain attention in the United States. The competition is based on the utilization of a virtual construction simulation program called MERIT. Virtual construction simulations have been around for decades, yet, are still somewhat new to the construction industry and construction education programs. This past year, a group of California Polytechnic State University students studying Construction Management participated in the competition as the university's first ever team. This paper will examine the competition as a whole, providing details on how the program was run, outlining successes and challenges faced during the competition, and providing feedback for future students who choose to participate in the competition. The paper will also make comparisons to other construction competitions the university competes in while discussing the benefits of virtual construction simulations as a tool for construction education programs.

**Key Words:** Chartered Institute of Building (CIOB), virtual construction simulations, MERIT, student competitions

## Introduction

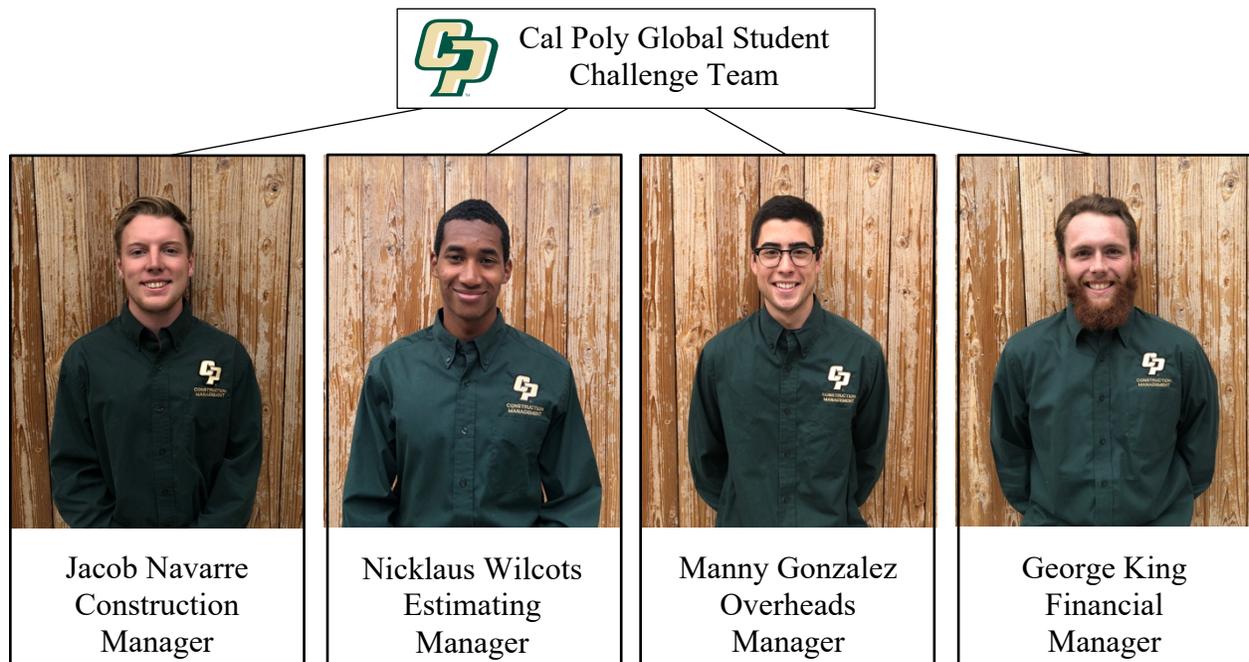
The Construction Management Department at California Polytechnic State University has been competing in construction competitions for numerous years. The main competition for which the department competes within on a yearly basis is presented by the Associated Schools of Construction (ASC). The department travels to Chicago for region 3, Reno for regions 6 and 7, and Prague for the international region 8 competition. Multiple other competitions have emerged over the years such as the National Association of Home Builders (NAHB) student competition, Associated Builders and Contractors (ABC) student competition, and Design-Build Institute of America (DBIA) student competition.

This year, the Construction Management Department fielded its first team to compete in another student competition called the Chartered Institute of Building's (CIOB) Global Student Challenge. The Chartered Institute of Building claims to be the world's largest and most influential professional body for both construction management and leadership ("About Us"). The Global Student Challenge competition is currently in its sixth year of operation and is open to full time students from universities around the world ("Home - CIOB - Global Student Challenge"). The competition utilizes a virtual construction simulation program called MERIT (Management Enterprise Risk Innovation and Teamwork) that allows students to apply construction management techniques as they see fit. The main objective of the competition is for each team to run their own construction company with sole responsibility over company decisions while competing with all teams for the highest score. Scores are based upon a variety

of factors that affect the overall health of the company, stemming from each team’s company decisions. Some examples of these factors include choosing a project manager that has a background in the same market sector as a project assigned to them, or ensuring the company has sufficient capital base in order to meet the demand of the forward workload. Teams are made up of 4 students from each university, with each university having the opportunity to submit up to five teams. The only requirement for each team is that all members are full time students, from the same university, and studying a built environment or related subject field (“The Challenge - CIOB - Global Student Challenge”). Each team member has a specific role with responsibilities attached to that role. The Challenge tab on the Global Student Challenge webpage outlines the following roles and responsibilities:

- Financial Manager- The financial manager has control over interest to shareholders, company assets, and company investments.
- Overheads Manager- The overheads manager is in charge of analyzing market conditions that can benefit the company and allocating staffing for all departments of the company.
- Construction Manager- The construction manager oversees factors that affect job progression such as providing sufficient workforce, ensuring job completion, and managing site costs.
- Estimating Manager- The estimating manager has the responsibility of choosing what jobs to estimate based upon the project delivery methods, risks, and staffing allocations associated with each project.

The Cal Poly team that competed within the 2019 Global Student Challenge were made up of a group of 4<sup>th</sup> year students with a major in Construction Management. These students and their roles within the competition are listed below in *Figure 1*.



*Figure 1:* Organization chart showing Cal Poly team members and positions.

### *Competition Timeline*

The following information for the Global Student Challenge timeline was gathered from the Home page for the CIOB Global Student Challenge webpage. The Global Student Challenge 2019 began its registration on November 5, 2018 and closed on February 28, 2019. Starting on January 28, 2019, teams were allowed to get familiar using the MERIT program in what was called “The Foundation Years” of the competition. “The Foundation Years” are essentially a trailing period where students were encouraged to practice using the MERIT program, making company decisions, submitting trials, and receiving feedback for submittals. On March 1, 2019, the real competition began in what was called “The Early Years.” This stage of the competition took place over the next 6 weeks with a submission due each week. Each week of gameplay was termed as a period, with “The Early Years” starting on period five in order to provide past company history for future decisions. Within the game, the periods were to be thought of as quarters. Finalists were announced on April 19, 2019. The Global Student Challenge chooses the top 6 teams to compete as finalists in a “Finals Week” competition that takes place in Edinburgh, Scotland between June 23-27, 2019.

### **Literature Review**

Given that the actual competition, the Global Student Challenge, was itself a virtual construction simulation game, the majority of the research conducted during the literature review for this case study was related to virtual construction simulations rather than research based towards student competitions as a whole.

#### *Virtual Construction Simulations*

Virtual construction simulation games are nothing new to the construction industry or construction education. However, they have not been integrated within the industry or classroom as much as they could be until somewhat recently. The theory of virtual construction simulations games is based on the idea of real industry experience within a virtual environment that allows individuals to gain experience and knowledge without the factors of risk (Korman and Johnston). Many construction simulation games will place students in teams of around four or five members. Collaboration is a huge aspect within the construction industry, so it only seems right that it should be encouraged within construction education as well. Korman and Johnston state, “Good learning, like good work, is collaborative and social, not competitive and isolated. Working with others often increases involvement in learning” (Korman and Johnston). To interpret this a little further, students learn more when they are able to bounce ideas off one another and share knowledge from their different experiences within construction. Construction simulation games embody this philosophy whether it be by designating roles and responsibilities to team members or allowing whole teams to work together through the different aspects of the game.

Looking specifically at the MERIT simulation program, the first version of the program originated in 1988 and was paper based due to the lack of technology (Higgins). The program was initially sponsored by Balfour Beatty, who provided a staff to process the data, and required

participants to send in forms with completed decision-making responses that were then processed and returned to the participants (Higgins). The second version of the game, which took place between 1994 and 1998, developed with new technology where participants transferred data using diskettes (Higgins). The third version, which is what's in use today, uses a web-based data delivery system and has numerous other sponsors that have evolved the game into what it is today, a leading construction simulation system that more than 20,000 young engineers and students have engaged in (Higgins).

## **Methodology**

The research method used for this case study was almost entirely qualitative. The methodology I used consisted of an analysis of my own involvement within the Global Student Challenge, as well as an analysis from the rest of the team member. The research I collected based upon each team member's account of the competition was collected through a qualitative process by interviewing each team member. Each interview contained the same interview questions that can be found in Appendix A of this paper. Most of my background information relating to virtual construction simulations was gathered through qualitative data that I gained through an extensive literature review.

My objective for this case study is to:

- Provide knowledge and details on the Global Student Challenge and the MERIT program the challenge is ran through
- Analyze the successes and challenges that the Cal Poly team faced during the competition
- Recommend feedback to Cal Poly students who wish to participate in the challenge in future years
- Determine whether the existing Cal Poly Construction Management curriculum provided enough knowledge to be prepared for the Global Student Challenge

## **Case Study**

The primary purpose for competing in the CIOB Global Student Challenge was to gain exposure within a construction student competition on an international level. The group of four, myself included, were the first team from Cal Poly to enter the competition and one of few teams that entered the competition from other universities in America.

### *MERIT Gameplay*

The program that the competition was ran through was called MERIT, The International Construction Business Game, and has been supported by The Institution of Civil Engineers since 1988("Home"). The program offers virtual construction competitions to universities and working professionals around the world. The Global Student Challenge competition that that Cal Poly team participated within was one of multiple MERIT games that, in our case, was based towards undergraduate students at universities around the world. The program breaks down the game as a

whole into three tiers which are Decisions, Information, and Performance. Decision making is categorized into six sections that include the following: Financial, Overheads, Estimating, Bidding, Personnel, and Construction. The Decisions tier is where all decisions were recorded under, while each decision-making section is somewhat self-explanatory as to what entails within the section. The Information tier contains details and reports that relate to company and financial information, analysis of jobs, financial details, and workload limits. The material under this tier contained important factors that relate to the company as a whole and provide guidance as to what decisions should be made. The last tier, Performance, provided knowledge on how the company was doing based upon performance indicators, reviews, statistics. More than anything, this tier gave feedback as to how decisions were affecting the company while also providing client relationships.

Getting comfortable with the program took some time as it was an unfamiliar platform to all of us. MERIT provides an extensive tutorial, totaling 560 pages, that describes how decisions affect the company and how to go about making decisions within the MERIT program. After studying the tutorial provided, our team started submitting trials in an effort to “Learn by Doing.” We submitted a total of 40 trials and decided we felt comfortable once we received numerous excellent reviews.

## **Results and Discussion**

Our team had hoped for better results in the end of the competition as we did not make the finalist stage. However, every member of our team felt accomplished having participated in the competition. The following information gathered in this section was compiled through interviews with each of the Cal Poly team members who competed in the Global Student Challenge. The goal of this case study was to deliver information related to the Global Student Challenge in order to offer knowledge and experience to Cal Poly Construction Management students who choose to compete in the competition in the future.

### *Successes and Challenges*

After interviewing the other members of the team and also incorporating my own personal experience from the competition, I have organized a set of the successes and challenges that our team faced. The biggest successes of the competition came from learning how virtual construction simulations operated along with how to run a construction company on an executive level. However, there were many challenges that came along with these successes. The biggest challenge that all members of our team agreed upon during each of their interviews was working together as a team. Not in the sense that there was bad team chemistry, but that it was difficult to find time where we were all free to meet. Most members of the team have competed in ASC competitions in the past and all members understand how to work together, but we found it hard to coordinate time with us all having busy school schedules. Another challenge that Manny Gonzalez pointed out during his interview was that the MERIT simulation program was fairly difficult to navigate around with and the program almost provided too much information to the point where there was confusion.

### *Lessons Learned*

Although our team had hoped for a better outcome in the end of the competition, we all felt like we learned some valuable lessons throughout the competition that will help us after graduation and throughout our careers. The largest lessons our team learned related to the financial aspects of the competition. After completing the trial period, we found that the simulation was heavily based on company finances, even to the point of setting dividends for shareholders and choosing investments that could reduce build costs for certain projects. Everybody from our team agreed that it was interesting and insightful learning about these financial decisions that companies face on a day-to-day and project-to-project basis. A major aspect of these financial decisions that Nick mentioned while interviewing him was the forward outlook associated with them. Often times during our lab courses we are expected to look at the financial implications of a single job, but when looking at financial implications of a series of jobs things get more confusing. We found that we had to be thinking at least three, sometimes even four, periods ahead when discussing what jobs to pursue during the bidding stage. Another huge lesson we learned relating to company finance was having enough cash on hand to provide sufficient expenditures not only for on-going jobs, but for future jobs that we to be bid.

### *Feedback to Future Participants*

Although our team had hoped for a better outcome in the end, we hope that the lessons we learned during the competition are able to provide Cal Poly students who wish to participate in the competition in future years with guidance in order for them to be more prepared. Our team all agreed that the biggest advantage any team in the competition can give themselves is capitalizing on the trial period that occurs before the main competition. The trial period is designed for students to gain understanding on how the program runs and how to make decisions. The next advice that I thought of while thinking of my own team's experience was really diving into the instruction tutorial. Although the tutorial is quite extensive with its 560 pages, it provides every detail about the program and is the best source of knowledge when making-decisions. Lastly, Nick and I both agree that making a weekly schedule for team meetings should be a top priority after a team is formed. Our team did this after the trial period before the main competition began, but it almost set us back when the main competition began. Working through the trial period as a team is very critical in our opinion because it ensures everyone on the team has the same level of knowledge when the main competition starts.

### *Determining Preparation for the Competition*

Another objective for this case study was to analyze whether or not the current Cal Poly Construction Management curriculum prepared our team enough for the competition. This isn't to say the curriculum doesn't prepare students for the construction industry in the United States, but many of the challenges we faced during the competition related to company financials that may be focused on more outside the US. Everyone on our team agreed that the Global Student Challenge was substantially different than any ASC competition we had. When talking with George and Nick, they believed that the current curriculum did prepare them for the competition but felt that the terminology seen within the competition was different than what he had seen studying at Cal Poly. Manny and I agreed with them to a certain extent. However, we felt that

the current curriculum could be expanded upon in order to cover more company overheads and financials that relate to market analysis, capital base, and forward outlook for a company.

## Conclusions and Future Research

The CIOB Global Student Challenge was a valuable experience not only for myself and my fellow teammates, but also for the Cal Poly Construction Management department. Although our team didn't make it to the finalist stage of the competition, everyone on the team learned a tremendous amount of knowledge as it relates to running a construction company on an owner or project executive level. I hope that Cal Poly students pursue this competition in the future years to come and that the feedback within this case study will provide them with knowledge to give them advantages over the rest of the competition. Personally, I believe international student competitions allow students to participate in an immense experience that not only benefits their education while in college, but also their careers after graduating. The Global Student Challenge was unlike any ASC competition I had participated in previously and it presented new challenges that I had not experienced before. However, those challenges translated into successes along with a vast network of knowledge that related to new aspects of construction management that I was previously unfamiliar with.

## References

“About Us.” *CIOB*, The Chartered Institute of Building, [www.ciob.org/about](http://www.ciob.org/about).

Čásenský, Martin, et al. *Using Simulations to Better Train Future and Existing Construction Management Personnel*. Creative Construction Conference 2014, 2015. [creative-construction-conference.com/wp-content/uploads/2015/01/CCC2014\\_O\\_Drnek.pdf](http://creative-construction-conference.com/wp-content/uploads/2015/01/CCC2014_O_Drnek.pdf).

“Home.” *MERIT*, Construction Industry Simulations Ltd., [meritgame.com/](http://meritgame.com/).

“Home - CIOB - Global Student Challenge.” *CIOB*, The Chartered Institute of Building, [gsc.ciob.org/](http://gsc.ciob.org/).

Higgins, Jonathan. “Overview.” *MERIT*, The Chartered Institute of Building, [meritgame.com/about#history](http://meritgame.com/about#history).

Johnston, Hal, Borland, Jim, Craig, Kevin. *Building Industry Game (B.I.G.) A Computer Simulation for Construction Management*. ASC Proceedings of the 39th Annual Conference, [ascpro0.ascweb.org/archives/cd/2003/2003pro/2003/Johnston03.htm](http://ascpro0.ascweb.org/archives/cd/2003/2003pro/2003/Johnston03.htm).

Korman, Thomas, and Hal Johnston. “Enhancing Construction Management Education through the Use of a Virtual Construction Company Simulation System.” [http://www.iiis.org/CDs2010/CD2010SCI/EEET\\_2010/PapersPdf/QA539UT.pdf](http://www.iiis.org/CDs2010/CD2010SCI/EEET_2010/PapersPdf/QA539UT.pdf)

Korman, Thomas M, and Hal Johnston. “Using Game-Based Learning and Simulations to Enhance Engineering and Management Education.”

Korman, Thomas, and Hal Johnston. “Development of Use of a Virtual Construction Company Simulation System for Education.”

Navarre, Jake. “Personal Interview with George King.” 30 May 2019.

Navarre, Jake. “Personal Interview with Manny Gonzalez.” 31 May 2019

Navarre, Jake. “Personal Interview with Nicklaus Wilcots.” 30 May 2019.

“The Challenge - CIOB - Global Student Challenge.” *CIOB*, The Chartered Institute of Building, [gsc.ciob.org/the-challenge/](http://gsc.ciob.org/the-challenge/).

### **Appendix A – Interview Questions**

Describe your role in the competition.

What skillsets did you use most during the competition?

What did you enjoy most about the competition?

What do you believe were the biggest successes and challenges of the competition?

What advice would you tell Cal Poly CM students who choose to compete in the competition in future years?

How do you feel this competition compared to any other CM student competitions you’ve participated in?

Do you feel the existing Cal Poly CM curriculum prepared you enough for the competition? If not, what knowledge do you think was missing?

What were some of the lessons learned from your experience with the competition?

How will you apply the the knowledge and experience gained through the competition in future years?