Operations Constructed – Jobsite Material Delivery Website

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Operations Constructed is a program a couple students developed to help enhance the material delivery process on-site through innovation. Through partnering a construction management student and a computer engineering student the team developed Operations Constructed which modernized the material delivery process. Through industry research, Cal Poly Entrepreneurship mentorship, and faculty input the team produced a program that is simplistic enough for the old-school construction industry. Presently many construction companies use white boards or excel sheets to schedule their material deliveries whereas Operations Constructed would provide an automated means of coordination, confirmation, and execution of the same deliveries. The final product is a completely functional website that construction companies can use to locate all information pertaining to any specific material delivery.

Key Words: Material Delivery, Innovation, Construction, Operations Constructed

Introduction

The Cal Poly Entrepreneurial School is a relatively new school at Cal Poly under the College of Business. The Cal Poly Entrepreneurial School started a program called the Hatchery, which provides students with the entrepreneurship spirit an opportunity to pursue their startup dreams. Through the Hatchery, students can receive mentorship from Executives in Residence, apply for the summer Accelerator program which provides them with 10 weeks of non-stop mentorship, and compete in various competitions which can provide them with potential funding.

This project, Operations Constructed, was designed and developed to bring further innovation to the construction industry. Specifically, Operations Constructed is a solution to automate the material delivery process to construction sites. Most general contractors in today's industry mainly incorporate the use of excel sheets, whiteboards, and in-person meetings to coordinate the weekly material deliveries. Exploring the market and all the various ways of tracking materials coming to the construction site, Operations Constructed provides an alternative solution, an online weekly schedule viewable in real-time, reflecting any last minute changes made by the general contractor.

Operations Constructed provides general contractors the ability to update their delivery logs immediately and have those changes reflected in calendars viewable by the subcontractors. Using an online approval process via the general contractor platform, subcontractors can request specific delivery times remotely and get the times approved by the general contractor on-site. Furthermore, any specific directions or procedures regarding each deliverable will be readily available to the general contractor all within one program. Rather than scouring through thousands of emails for delivery data the website would compile time and date of deliveries, materials to be delivered, equipment needed to move materials, staging area, etc.

Entrepreneurial Process

The California Polytechnic Entrepreneurial School provides a plethora of resources to aspiring entrepreneur students. Through their student resource, The Hatchery, students can get mentorship from Executives in Residence, attend workshops every Friday that cover a variety of start-up topics. The Hatchery also provides multiple competitions for students to participate in and earn funding to continue their business venture. Operations Constructed began as a student idea and eventually evolved through the help of the entrepreneurial school.

While The Hatchery provides limitless resources to students, the business venture is solely the student's responsibility to carry it into fruition. Through mentorship and start-up workshops Operations Constructed became a reality. After administering an industry survey, the baseline solution Operations Constructed would provide was

determined by differentiating what feedback should be part of the wish-list and what feedback was an essential piece to the solution. From there development of the Operations Constructed website began and was modeled after existing construction software to minimize the difficulties that may arise when companies try to integrate the program into their operations. Once the program was completed Operations Constructed was alpha tested using sample data to confirm its functionality.

Learned Knowledge

Working with an interdisciplinary team has definitely been one of the most challenging experiences to learn from. The Operations Constructed Team is comprised of a construction management student and a computer engineering student. It was especially difficult because computer engineering students are taught a very different means of thinking compared to construction management students, so determining the end-product functionality for Operations Constructed proved difficult. Furthermore, not everyone one the team had as much exposure or passion for the construction industry. When starting a company all team members should be passionate about the product or service that will be provided, with that passion all team members will have additional motivation to complete the product and make it the best product possible. In the future, when building a team to start a company more care should be taken in selecting all team members, ensuring that everyone on the team is passionate about the product they will be designing or marketing.

Deliverables

Below is a list of deliverables including screenshots of a fully functional website and a survey distributed to industry partners within the construction industry.

Fully Functional Website

The fully functional website includes several different pages that are mirrored for both the general contractor and the subcontractor, with the only difference being the additional managerial functions for the general contractor.

Sign-In Page

The Operations Constructed sign-in page is modeled after the sign-in page for Procore. Understanding the current construction industry resistance to change and lack of ability in understanding technology, Operations Constructed was modeled after construction software already in industry to make the implementation of this software as seamlessly as possible. Within the sign-in page contractors would sign-in using a work email, insert contact information, and indicate whether the company is a General Contractor or a Subcontractor.

Material Delivery Scheduling Page

The Operations Constructed scheduling page is simply designed to minimize confusion by less technology savvy professionals. Subcontractors have the ability to submit multiple delivery times, indicate what equipment is required to transport the material, and indicate what material is to be delivered. On the general contractor's page, they have the ability to approve subcontractor deliveries, remove equipment listed not available, and reschedule the delivery time that best fits the general contractor delivery schedule.

Calendar View Page

The website calendar view is viewable from the material delivery scheduling page just below the scheduling functions. Within the calendar view the general contractor or the subcontractor has the functionality to view the entire approved material delivery schedule for the specified construction page in agenda, monthly, weekly, or daily calendar view formats. Additionally, all users have the ability to double click any of the approved deliveries within the calendar view and a pop-up window will appear with all the specific information regarding the delivery selected.

Auto-Generated Email Template

One documentation file exported and directly delivered to the parties involved with a delivery is an auto-generated email containing all the necessary information for the specific delivery. The email will contain subcontractor who submitted the delivery request, delivery time requested information, delivery time approved information, equipment listed, material to be delivered, and contact information for primary point of contact regarding delivery.

Industry Survey

The industry survey administered in the industry provided Operations Constructed with valuable information on how the website should be designed. Some information included within the survey was what is the surveyed applicant's personal career information, applicant's company information, how does the company manage the material deliveries to the job-site, whether they could envision a website like Operations Construction solving the inefficiencies currently found within the material delivery process, and what features would they suggest be included within the program.

Lessons Learned

Developing and building an online start-up is a challenging process especially with no computer science background. Even with a partner who studied Computer Engineering, learning how to best communicate in a manner that all parties would understand is very challenging. Some of the major challenges involved with the development process was communicating the functionality expectations and explaining the purpose and solution the program would provide. Functionality expectations was definitely the hardest challenge because the vision for how the website would look and function was very different from the finish Operations Constructed website. Another major challenge developing the website was explaining the purpose and solution the program would provide to the construction industry with a partner with no prior knowledge of construction. It was especially difficult to motivate and get all team members to buy into the program because everyone was not as passionate about the product.

In the future when designing a new website, preliminary design criteria should be established accompanied by sketches of how the website is expected to look. Multiple sketches of the website should be drawn beforehand to illustrate how the functions of the program should work. Furthermore, in the future the purpose and solution should be well established earlier in the development process in a manner understandable by all team members regardless of their exposure to construction.

Industry Contribution

Operations Constructed has a lot of potential to impact the construction industry immediately. By bringing innovation to the material delivery process general contractor and subcontractor personnel will be able to schedule, verify, and reschedule their deliveries. By introducing Operations Constructed to the industry the need for in-person meetings, constant back and forth emails, and the back and forth phone calls will be replaced virtually through the Operations Constructed approval and rescheduling solution.