Benefits of Personalized Construction Management Software: A Case Study

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In today’s construction industry, one of the most important aspects of any project, aside from health and safety, is the ability to increase productivity through proper management applications. There are an abundance of programs available to today’s industry (Patterson, 2015); however, some companies are creating their own versions. Many of these programs are tailored to the specific needs of the individual companies. This case study is an in-depth evaluation of personalized construction management software that was implemented by NOVO Construction Inc. It also evaluates the employee preference of personalized software versus software readily available on the market today. The result of this research concludes that not only was efficiency, based on work hours, improved, individuals believe that personalized management software is beneficial in today’s growing construction industry.

Key Words: Construction Management Software, Efficiency, Personalized Software

Introduction

Advancements in today’s technologies have allowed the construction industry to reach new heights in management and collaboration. These are two aspects of any construction process that, when executed properly, assist in driving the project to a successful completion. With any project, collaboration amongst the different team players (General Contractor, Architect, Property Manager, Facilities, Client, etc.) may be difficult to achieve due to varying workloads and schedules; however, this communication has been vital to ensure that a project remains on schedule and under budget (Gregg, 2009). The current construction management software available to this industry is increasing efficiency by making this daunting task more manageable. Furthermore, personalized construction management software takes productivity to a whole new level.

The nature of construction is extremely complex due to its unpredictability (Daniels, 2014); thus, new advancements in management software are allowing companies to stream-line their communication with clients, architects, and internal project teams. This capability is revolutionizing the area of project development as well as the construction process by maximizing efficiency, organization, and uniformity. Construction management software utilizes interfaces for scheduling, estimating, billing, planning, contractual agreements, in addition to RFI (Request for Information), and submittal communication between the General Contractor and Architect. These are all vital documents that need to be updated regularly throughout the duration of any project (Ghanem, 2015). In order to address these needs, software management platforms are now incorporating real-time communication, cloud-based capability, and quality management applications.

According to the Government Labor and the Statistics Bureau, the construction industry is expected to grow faster than any other occupation over the next year. The projection of construction across the United States has been estimated to increase 5 to 15 percent in 2015 (Santos). This upsurge in construction projects will in turn cause more project schedules to accelerate, thus, resulting in a need for maximum efficiency. In order to keep of with these projected demands, the industry will have to utilize the most efficient aids available to them. The implementation of construction management software will provide this assistance for general contractors. This allows for ultimate workload management and centralized documentation for projects of varying sizes and scopes.

When I first started at NOVO Construction Inc. (NOVO) as an Engineering Intern, a General Contractor based out of the Silicon Valley, I was assigned to a 120,000 square-foot client occupied tenant improvement plan for an artificial intelligence company. Due to the unique scope of the project, fast-paced schedule, and half-occupied floors, communication and proficiency were vital for a successful outcome. During this process, it was quickly
brought to my attention that breakdowns in communication between members of my project team were directly related to the limiting scope and use of Microsoft Programs such as Excel and Word. This restricting use of software resulted in constant challenges for our project team. The primarily obstacle was that the documents were saved on isolated operating systems. Access to saved data was only available to team members if the information had been directly sent to them. This system was not only inefficient, but increase the possibility of human communication errors.

The utilization of Microsoft Programs also inhibited the company from producing documents that were uniform and consistent company-wide. Upwards of 70% of the employees reported using Microsoft programs on a daily basis. Due to NOVO’s large employee base, uniformity would be increased if all internal project teams collectively shared and used a single document-producing interface. This need was rectified through the development of a company-specific software known as Sentinel. NOVO sought to increase their competitive edge and take it a step further by creating a software that addressed the precise needs of their employees, clients, and project teams.

**Methodology**

The main objectives of this case study are as follows:

- To analyze the company’s previous experience in managing construction projects prior to the development of Sentinel.
- To examine whether or not the efficiency of the company increased, decreased, or remained the same after the development of Sentinel based on employee work hours, monetary savings, effectiveness of communication, reduction of human error, etc.
- To determine whether or not the company’s employees prefer “prepackaged” project management software or personalized project management software.
- To evaluate the uses of the project management software and the specific needs of the company.

These objectives were analyzed through quantitative data. The quantitative data was obtained through an online Google Forum survey sent to all of NOVO’s San Francisco and Menlo Park office personnel and field staffs. The office personnel consisted of project administrators, project managers, assistant project managers, project engineers, project engineering interns, accounting, and the executive team. The field staff was comprised of project superintendents that generally use the program on-site. The survey was conducted after the software had been implemented and utilized for approximately two years. The results were explored in this case study’s Discussion, Results, and Conclusion. The result of this study will be sent to NOVO for their own analytical use.

**Discussion**

**Background**

I was given the task to create and distribute many of the associated construction documents needed to drive the project to completion. These documents included, but were not limited to construction drawings, submittals, RFIs, meeting minutes, procurement logs, contracts, contact directories, and all associated logs. The previous documentation for projects would soon be the focus of Sentinel. Like any large scope project, documentation was a requirement to ensure accountability and used as a measure to inform the project team. The need to communicate through a centralized uniform system, rather than isolated ones, was essential to meet the demands of the project. My supervisor and mentor, Stephen Rotti, taught me how to produce and track all of the necessary documents to run the project; however, there were times where breaks in communication resulted in issues that were directly correlated to our software. We had to collaborate on a daily basis, sometimes up to five times a day just to ensure that all needed documents were accounted for, a step that has been completely eliminated by the use of our specialized, construction management software.

**What is Sentinel**
Over the years, the growing NOVO Construction Inc. recognized the need for a company-wide uniform interface that allowed for collaboration not only with internal project teams, but all entities involved during the construction process. With many teams using individualized means and methods to interact with a wide-variety of clients, the need for uniformity, efficiency, and organization became more prevalent. Although there were many different software platforms available at this determinate time (Procore, BuilderTREND, Co-Construct, etc.), NOVO wanted to create an interface of their own to assuage the specific needs of their clients and company. Thus, in December of 2014, the company launched their own personalized documentation software named Sentinel.

This new user-friendly interface incorporates all management aspects of the project including; preconstruction, the project build-out, and project closeout. One of the most unique features of Sentinel is its capability to produce documents that are personalized to NOVO. These templates are generated for every project and allow for uniformity and efficiency amongst internal project teams.

Sentinel addressed the issue of isolated documentation, through integrating the use of a cloud-based technology known as BOX. This is a collaborative software that allows centralized file sharing between individuals. A key aspect that sets Sentinel apart from other construction management software is its ability to generate documents and save them directly to a collaborative folder located on the computer’s internal memory. These folders can then be selectively shared with external project team members and accessed from any mobile device, at any time.

Integration of BOX

One of the key elements of Sentinel is its integration of the Cloud storage software known as BOX. BOX was designed and developed for companies that have a need for files to be synchronized across a uniform platform (BOX). This software gives Sentinel a secure place to store sensitive files and data, while being directly accessible from the program’s interface. BOX addressed the company’s issue of file isolation by allowing teams to collaborate with the latest documents and information in a centralized saving location.

The BOX application for mobile devices also allows members to access project files remotely that were created using Sentinel. This capability lets project teams have access to files at any time and place.

Cost Savings

Although there was a cost associated with the development of the new software, NOVO has eliminated the cost of the individual licenses required for the products that are available to the industry today by developing its own. Many of these products are only available to the license holder for a particular amount of time, which results in a higher annual cost.

The utilization of Sentinel and its mobile applications will also reduce the amount of time the isolated systems required. Incidentally, now that the entire company is using this resource, mistakes caused by human error will also be reduced. Overall, Sentinel will fix the break in communication between project teams that once existed. Considering all of these previously mention factors, work time and workload will be decreased and will directly result in monetary savings for NOVO.

Results

Description and Data Interpretation

The following section dissects data collected from NOVO’s the initial survey. The survey was composed of 12 questions; however, only 8 of the 12 were utilized in this document based on their pertinence to the topic of this paper as a whole.
Shortly following the launch of NOVO’s new software, the marked increase in productivity and efficiency was evident as depicted in Figure 1. On average, 95% of employees reported an increase in their efficiency by decreasing their work load 3-5 hours weekly after the implementation of the program. Project teams were now given the capability to communicate more effectively, comprehend the current status of a particular project in its entirety, and relay information to external project members in a more uniform way and expedient way.

**Figure 1**: Efficiency.

Before Sentinel was introduced to NOVO, 70% of employees used Microsoft based programs on a daily basis to produce company and project related documents. After the new program was introduced, only 40% of employees used the Microsoft programs and in light of this, uniformity among documents, project and office increased because of Sentinel. These results are based on data indicated in Figure 2.
Although the software was relatively new to everyone, it was very easy to navigate and understand because of its user-friendly and intuitive interface. Many of the products available to the industry today run complex interfaces that make them so that they are not user friendly; however, this was an aspect that Sentinel was specifically designed to address.

Approximately 47% of employees reported that they had previous experience with “prepackaged” software before Sentinel; furthermore, 93% of employees expressed that they “would rather use personalized project management software such as Sentinel than ‘prepackaged’ software” as shown in Figure 3.

![Figure 3: Personal software preference of NOVO employees.](image)

Not only did employees prefer using Sentinel rather than “prepackaged” software, (as depicted in Figure 4). Data also indicated that approximately 90% of those questioned believed that the personalized attributes of Sentinel made the it more effective. Furthermore, Sentinel’s effective nature led to additional benefits that were not available with “prepackaged” software, e.g. Procore, BulderTREND, Co-Construct, etc. The incorporation of project management, administration, and accounting makes consistent communication more achievable, even when busy work schedules are compromising. This program’s wide array of features makes communication between upper management and field personnel much more convenient. NOVO is also able to create additional features and change the software’s interface to adapt to the growing needs of the industry thru their in-house IT technician.

![If the previous question applies, do you believe that Sentinel has been more effective than “prepackaged” software such as Procore, SiteMAX, Co-construct, etc. in managing projects for NOVO due to its personalized attributes for the company?](image)
One of the key goals that NOVO wanted to achieve with the development of Sentinel was to create a program that would encompass the needs of all employees. Data from this bar graph below depicts the wide range of documents that are required for different phases of a construction project. Data indicated that 32% of daily users were project engineers, 32% project managers, 10% superintendents, 15% project administrators, 1% project engineering interns, and 10% other. Sentinel was primarily used for Submittals, RFI’s, Change Orders, and Contracts as shown in Figure 5.

Figure 5: Applications of Sentinel.

According to the data collected in Figure 6, among the different positions utilizing a single program such as Sentinel, 88% of NOVO employees believe that personalized project management software is beneficial to any company within the construction industry.

Figure 6: Relevance of personalized project management software to construction industry companies.

With personalized project management software such as Sentinel which are easily accessible, efficient, beneficial and useful to all ranks of employees (in a rapidly growing company such as NOVO), 70% of employees agreed that utilizing Sentinel even increased company morale as shown in Figure 7.
Conclusion

As construction continues to be one of the highest industries in demand, General Contractors must use efficient, organized, and uniform management tools to remain competitive. Potential clients are seeking firms that can address all of their needs aspects that pertain to their particular project. Today’s clients require reassurance from the company of their choice to showcase the ability to successfully complete their job. Coordination between all of the involved parties during the construction process is an easily obtainable element with the use of construction management software (Note Vault). There are many interfaces available on the current market; however, some firms have realized the value of programs that have been tailor made for their company.

NOVO’s development of Sentinel fulfills the needs of not only their external parties, but also the internal project teams that are using this personalized software on a daily basis. Although the development of a system of this complexity is not economical or suitable for all businesses, the overall direction for management within construction field is moving in the right direction. It is addressing and altering its tech usage to meet increasing demands. NOVO has gotten a jump on its competitive edge by designing and implementing a system that not only meets the needs of its employees, but all parties involved in projects no matter their sizes and scope.

The survey conducted for this case study was designed to create a better understanding of how a construction company was affected by the implementation of personalized management software. Future research could include, but not be limited to, a detailed financial analysis of the cost implications for creating such software, conducting research on other companies for comparison information, and an in-depth evaluation of the different features offered amongst available “prepackaged” software versus personalized software.

References


