

The Use of Project Specific Websites as a Virtual Office

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Abstract

The use of internet based collaborative project management is presented as a method for improving the overall construction delivery process by effectively providing improved communications, coordination, and collaboration among project team members. The use of internet based technologies to address recently identified owner concerns is proposed as a viable justification for application.

Keywords

collaboration, project management, construction, communications, virtual office

1. INTRODUCTION

Fragmentation of the construction industry has led us to a world where construction project managers are faced with the grim realities of a continuous time constraints and schedule conflicts by needing to be in more than one place at any given moment; more than one jobsite, at more than just one meeting; trying to meet with more than one person faced with these same issues; not to mention that these vital interactive communications between project team members are critical to the success of the overall project. How can today's construction project managers meet these increasing demands? One way may be through a form of virtual reality and the application of a concept known as a virtual office. Internet technology has advanced to the point where we can develop and utilize a Project Specific Website (PSWS) to manage information and communications on multiple projects simultaneously from a single source – your computer. The virtual reality concept through the use of a PSWS is based on the fact that via a PSWS one can obtain everything needed about the project to make effective decisions, just as if the individual was actually sitting in the job site office. So in essence we create a “virtual office environment” using the PSWS as our link to “reality”. The PSWS can provide a collaborative platform for all types of project information, as well as web-based meetings using WebEx or Breeze. This paper will present ideas on how the PSWS provides its users with a virtual office environment by detailing a Pass's capabilities for coordination, communication, and development of project information from a single log-in to their “virtual office” (VO). This VO is a populated office with access being available to all project team participants from their desktop.

The author's perspective comes from over 20 years of construction project experience and nearly ten years of utilizing a project specific website (PSWS) since its initial development and roll out in 1997. In addition, the author has provided feedback to the ASP, now referred to as software as a service (SAS), throughout this same time frame in the continuous improvement and implementation of this technology from both an academic and industry practitioner perspective.

2. INFORMATION IS POWER

Managing information has become perhaps the most critical success factor for construction operations. Given the highly complex, fast-paced, and dynamic nature of construction it has become evident that in order to complete a project that meets the needs of the customer then all vital information (i.e.,... land acquisition, funding, programming, designs and engineering, specifications, decisions, budgets, and general correspondence) must be developed and maintained in a fashion to support effective development, utilization, and communication. Coupled with increased demands placed on all key parties to the building process (owners, designers, and contractors), the industry is at a critical juncture in addressing these problems plaguing our industry in an effective long-lasting fashion, many of which are not new to practitioners. One very effective way to address this situation is Project Specific Web Sites (PSWS) as a Virtual Office (See Figure 1).

PSWS applications take advantage of the Internet to perform typical project management tasks, such as store and manage project information. They allow all necessary groups of people such as contractors, engineers, architects, and clients, controlled access and

automated distribution of information. The combination of the internet and project management systems has opened many new communication pathways. Through the integration of these two systems, tasks can be accomplished better, faster, and cheaper. Better project control, especially during project procurement, can significantly impact savings on construction projects. (McMaster, 2006)

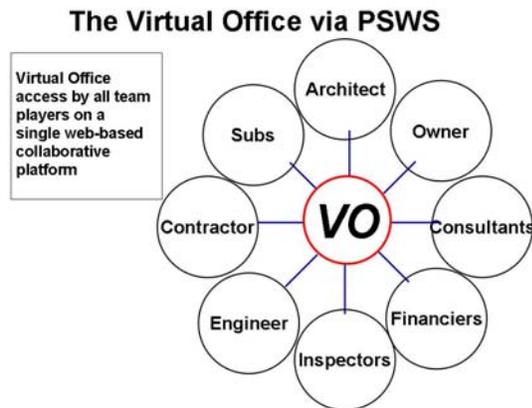


Figure 1: Virtual Office via PSWS

3. VIRTUAL COMPONENTS

The ingredients to virtual reality (VR) includes utilizing advanced technologies to produce a simulated interactive environment in which users perceive themselves in a situation that is most comparable to the real world in form and function.

Virtual Reality provides a new way in which people interact and analyze information. The technology is, in fact, an outgrowth of earlier generations of computing, and some of its core components have been in use for sometime.

The term "Virtual" is in reference to the computer-generated, or in the case of a PSWS, computer aided operational platform that simulates a real working environment.

The use of the word "Reality" is much more of argued since everyone has developed their own concept and definition of reality.

In this discussion, the term virtual office then comes to mean that the user is enabled to function and carry out their duties in a simulated (virtual) location that is not "really" at the project being managed.

According to Wikipedia, a virtual office is a computer network system that allows users to login in from any location (e.g. an airport) and access their email, documents and other stored files. In this sense, the 'office' is the place where the person logs into the computer network. (<http://en.wikipedia.org>)

Based on previous publications, it was suggested that VR consists of five main components (Wicken and Baker, 1994) depending on the context of the end-user. These five components include dimensionality, motion, interaction, viewpoints or frames of references and immersion or embodiment through multi-sensory experiences. This paper will categorize these components with respect to PSWS as a Virtual Office (VO) as: *visual interface, action oriented, interactive, various perspectives, and immersion* (see Table 1).

Table 1: Five Main Components of PSWS as a Virtual Office

PSWS VO (Cox, 2006)	VR Components (Wicken and Baker, 1994)
Visual Interface	Dimensionality
Action Oriented	Motion or animation
Interactive	Interaction
Various Perspectives	Viewpoints or frame of reference
Immersion	Immersion or embodiment (multi-sensory)

Each of these five components proposed by the author will be presented to discuss the validity of a PSWS as a Virtual Office by describing current uses of web-based project management systems that effectively provide and / or enhance each of the five VR components. The first component reviewed is the *visual interface*. This is followed by *action oriented, interactive, various perspectives, and immersion*.

3.1 Visual Interface

All project participants can access visual information on the PSWS collaborative platform. The interface is the computer screen or even a hand held device such as a PDA or Blackberry. The visual interface can be with a vast multiple of file formats, as a matter of fact the PSWS provider e-Builder is capable of converting over 250 file formats to Adobe PDF so that everyone can review all files without needing the native application. Project Specific Websites enable users to view or download files, mark comments, redline documents, and the original source file is not being affected. The redlining and commenting tools also work with 3D designs and large

CAD drawings as they are developed from the initial conceptual stages through complete design and actual construction. (Antevy, 2006)

In addition to having a visual interface with project drawing and text files, the PSWS is capable of collecting and sharing photos and streaming videos for monitoring progress, discussing problems, identifying potential issues, and historical archives.

3.2 Action Oriented

A collaborative PSWS provides the participants instant e-mail notifications of critical documents and process items. The user can actually select and place various prioritized notification levels across different documents and folders within the entire PSWS. The participant can have subscriptions to any or all files and folders and set it up to receive instant notification if any document or file is accessed, updated, or created by another project participant. If the user does not want instant notification then they can choose to receive a daily summary of all of the actions that took place within a subscribed folder. This action oriented component would allow the PSWS user to subscribe to their most important file folders for instant notification so that they are immediately notified via e-mail that a new file has arrived or perhaps a file has been reviewed, redlined, downloaded, or accessed by another project participant. Such an action provides the user assurance that they are in the information loop and process flow whether they are logged in on the PSWS or not. This provides the user the ability to best utilize their time and take action on other projects simultaneously while awaiting notification.

3.3 Interactive

Converts more than 250 file formats to Adobe PDF documents for easy viewing without having to purchase expensive software. This allows users to view, mark-up and distribute documents with multiple file formats in real-time without having any special software.

PSWS applications such as e-Builder™ offer a completely integrated document management and collaboration system for construction projects. Participants are brought together in real-time to work more efficiently while the system documents the communication across all parties involved in your project. This enhanced process can significantly shorten the development cycle, reduce risk, and dramatically improve the efficiency of project execution. This allows one to automatically manage and track your teams' work, including the transfer of documents (uploads/downloads), e-mail communications, and versioning. All affected team members are automatically notified of project updates so that time is not wasted working with outdated information. In addition, all of these activities can be accomplished across multiple projects through a single

secured log-in. Interaction among all of the user's projects is simply facilitated by moving from project-to-project websites scrolling a pull down menu listing all of your active projects. This increases "interactive" capabilities to multiple sets of project information for rapid and multiple interactions with various project participants simultaneously.

3.4 Various Perspectives

The PSWS collaborative platform actively includes all project players. Each web-based management system is accessible by the project owner, architect, engineers, contractors, subcontractors, suppliers, local building and code enforcement officials, financial supporters, consultants, etc... Thus, providing a multitude of perspectives from everyone involved in the project.

The e-Builder PSWS interface lets each team member view only the information that is specific to them. The System administrators apply role-based templates to establish the proper level of access for each team member to their job specific information.

3.5 Immersion

Given that literally all project documents are available on the project specific website, the component of immersion is one that is attained by the sheer fact the PSWS user can have access to every item of information on the project simultaneously. Thus, the PSWS user can totally immerse themselves into anything and everything from their single interface via the internet. The one feature of such web-based PSWS providers like e-Builder is the historical document archiving capability as well as the historical process flows and document handling data that is kept. The ability to see what has happened to any document, no matter what type or who created or initiated the form of communication since it was placed on the collaborative platform (who has viewed, copied, redlined, commented, downloaded, generated or responded to RFI's and ASI's, etc...) takes the concept of immersion to a higher level than most VO / VR applications. Virtual offices and virtual reality applications are mostly focussed on the present timeframe and provide an interaction that is reactive to the current set of actions from the user. In contrast, the immersion capabilities of the PSWS allow the user the ability to not only immerse them into everything that is taking place in the present timeframe, but they can actually be immersed in a continuum of interaction through the history of the documents being accessed. Such immersion provides the user the true total experience of being there because they not only have access to experiencing the present, but they can access the past, and even use the continuum of information to better understand the present to make the most

effective decisions for the future. This is just like watching the “replay” and being able to make adjustments in the game plan that improves your overall project performance.

4. AS GOOD AS BEING THERE

Effectively utilizing a PSWS can provide the project participants a sense of control over their areas of responsibility to the highest level. The ability to visually interface all project documents, take and receive action, interact with all project participants synchronously (as well as asynchronously), view from various player perspectives, and to totally immerse oneself into the past and present gives a PSWS user nearly total project experiences without actually having to physically be there. So this is as close as one could ever get to the action without actually being on the jobsite.

The one key ingredient of the human-to-human interaction that is desired and needed in order to completely manage the construction process is being addressed more and more each day with internet applications such as WebEx and Breeze. These types of applications can provide a true face-to-face interaction for a human-to-human interface in real time using the internet and a web cam. These new and evolving technologies allow project communications to include another dimension of non-verbal communications such as facial expressions and gestures. Using real time streaming video and audio in conjunction with all of the other PSWS capabilities will ultimately provide participants with a more true feeling of being there.

5. OWNERS' PERSPECTIVE OF PROJECT COLLABORATION SOFTWARE

Based on a recent survey of owners conducted by FMI/CMAA, eighty percent of owners surveyed thought project collaboration software could help reduce miscommunication and project disputes. In a separate question, however, there was a mixed bag of opinions on the subject. Nineteen percent thought collaboration software was too complicated; 4% thought it was too costly; 2% said, “It won’t work in our organization,” and 1% felt it was all of the above. Meanwhile, 27% said they were using it effectively now, 18% thought it could work, and 7% said “We need it badly.” Eighteen percent said they don’t know much about it. At the same time, owners appear to be reluctant to mandate the use of collaboration software across the project team. Of owners using collaboration software, only 35% said they mandated its use. Given that these tools have only been available since the late 1990’s, it is encouraging that nearly a third of owners surveyed reported that they are using these tools and roughly one-third of owners reported that using these

tools have shown sufficient benefit. These results would suggest that the practice of using a PSWS as a VO will be well received by project owners. (FMI / CMAA, 2005)

6. CONCLUSION

So without a helmet or joy stick, how can a PSWS be a virtual application or experience? While this discussion has shown that a PSWS does actually contain and provide for all five components of virtual reality, there is one clear major difference that does not allow one to refer to a PSWS as truly virtual. In order to be considered a virtual environment it has to be one that is simulated. In the case of a PSWS, none of the actual documents, interfaces, or information is simulated; it is all very real. In essence then, the main reason a PSWS could be considered a virtual office is the fact that it provides the users interaction with all of the project documents and participants as if they all were in the same vicinity. Therefore, a PSWS simulates team members being in one location at the same time with access to all project documents and information.

The use of technology has become an everyday affair in business and the use of internet based collaborative project management systems like a PSWS is a vital tool for the future of the construction industry. The value-added to understanding the overall performance by the ability to retrace prior steps to see how and why decisions made and actions were taken provides for continuous process improvement. As little as five years ago technology was considered a luxury in construction. In many cases, it was used only by firms wanting to be on the leading edge. Utilization of web based technologies is a more powerful tool that enables contractors to build bigger, better, and faster. Virtual or real, PSWS technology is making a major impact our ability to better manage and interact with multiple projects in various locations using our virtual office.

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