APPLICATION FOR
2012 LARRY L. SAUTTER AWARD FOR
INNOVATION IN INFORMATION TECHNOLOGY

UC Davis School of Law “Community Web Scheduler”

http://cows.ucdavis.edu
2012 Larry L. Sautter Award Submission – Community Web Scheduler

Project Title:

"Community Web Scheduler"
A collaborative application for scheduling meetings and events at UC Davis.
http://cows.ucdavis.edu

Submitter

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Project Team

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Project Summary

The Community Web Scheduler (COWS) provides a new way to schedule and market events on the UC Davis campus. Departments are able to create a dedicated site with information specific to their community. Community members are then able to view information about the events through either the native website or external applications such as Google Calendar and Outlook. In addition to viewing event information, community members can also reserve meeting spaces based on business rules developed within the department.

While the application can operate as a standalone scheduling system, it can also integrate with external systems to provide a seamless experience for end-users. Departmental websites and digital signage can leverage the information in the Community Web Scheduler to provide an integrated system. Future plans include extending COWS to integrate with more external systems, including importing course schedules from the campus student information system (Banner).

Project Description

Fundamentally, the Community Web Scheduler (COWS) allows members of the community to request room reservations without double-booking, subject to approval by an administrator. However, the system does much more than simply track room reservations; it functions as a hub of information for all
events relevant to a community. In addition to maintaining the event information, the system provides user-defined categories and metadata for organizing the events in a meaningful way. Now, community members can identify which events are relevant to them and easily integrate the event schedule with their traditional calendaring applications.

A More Flexible System

The Law School had an existing calendaring application which performed some of the needed functionality but fell short in other ways. To address these issues, COWS was planned as a major rewrite that would satisfy several business needs not addressed by the existing system. The most critical need was to effectively communicate information about events and other time-sensitive announcements such as registration deadlines to our community. The existing system had a single interface, forcing users to visit the main site and log in to find out what was happening in our community. In addition to the existing scheduling application, the Law School used email to communicate time-sensitive announcements. Through various feedback mechanisms it was determined that students don’t consistently read or respond to email communication. As a result, we needed to rethink how our scheduling system should be designed.

In order to satisfy the needs of the Law School community, COWS was designed as a hub of information accessible in a variety of ways. The goal was to leverage the tools that people already use in order to increase the likelihood that important events and announcements would reach the intended audience. COWS offers a core web interface, a calendar plugin for use on other websites, integration for traditional calendaring applications such as Outlook, iCal, and Google Calendar, and several feed formats for use in RSS readers or Javascript-enabled web pages.

UC Davis students are all provided Gmail and Google Calendar access. Additionally, many staff and faculty members use Outlook. With this in mind, COWS was designed to allow community members to access event information with the tools they are already using. A student can easily configure access to all events categorized as “Student Groups” for viewing within their Google Calendar. Since all future events categorized that way will also show up, they only need to visit the COWS site when making a room reservation request.

COWS was also designed to flexibly distribute events to multiple display locations via data feeds. The Law School has a number of LCD information kiosks and websites that are ideal for publicizing events. Within King Hall, building-wide digital signage shows a feed of the current day’s approved events. Similarly, student group websites subscribe to events within the “Student Groups” category, displaying upcoming events on their home page. Both of these scenarios are easily accomplished with a small amount of Javascript reading a COWS feed in JSON format. Any combination of categories and display locations can be used to define a COWS feed.

The COWS calendar display was created as a jQuery plugin that can be used on any web page. This is especially useful for external websites that wish to display their events as a formatted calendar. This
same plugin is the primary calendar interface on the main COWS site. As features are added to the main calendar UI, all sites referencing the plugin will benefit without the need to change any programming. The plugin also enables customized views to be created, enabling a website administrator complete control over what their specific users are able to see. The plugin can be loaded on any web page with ease simply by including a few lines of JavaScript code.

In addition to feeding external resources, COWS also integrates with external systems to leverage existing institutional data. Security groups can easily be populated from Campus LDAP or a department’s own Active Directory. Rights within COWS can then be assigned to the security group using either a custom or predefined access level. Security is kept simple by default in COWS. For a given user or group of users you can authorize them as a Viewer, Requester, Approver, or Administrator which applies to every resource in your site. If a more fine-grained security level is desired, a Custom role can be created to grant the desired authorization for any resource within COWS. Future plans for external data access include loading course schedules directly from Banner and developing two-way synchronization of room schedules with MS Exchange resource calendars. Exchange integration would allow community members to schedule meeting rooms directly from Outlook. Using COWS with Exchange synchronization extends the functionality of Exchange Resource Calendars to non-Exchange users (such as students).

**A Collaborative Effort**

During initial planning for COWS, the Robert Mondavi Institute approached the Law School with a request to use the School’s existing calendar software. This led us to re-evaluate the broader need for scheduling tools on campus. Before beginning any application development, we created a high level project plan for evaluation and comment by the campus-wide technical community, administrative leadership, and senate faculty using an established review process on campus. Through this process we received positive feedback and encouragement for the development of a centralized scheduling tool. Therefore, we developed COWS to be widely scalable to the entire campus.

Typically departments such as the Law School develop programs in isolation from the rest of campus. However, building on new initiatives for interdepartmental collaboration, we determined that sharing the code for COWS would be extremely beneficial. Collaborating with other departments’ developers would ensure the system contains features that are required by other campus units. This new paradigm also helps redistribute some of the workload for application development beyond the Law School. This change in strategy for us was made easier by the College of Agriculture and Environmental Science (CAES) which had already taken large steps toward facilitating collaborative development on campus. CAES generously provided a packaged programming framework called UCDArch that would simplify our initial development and ensure that other departments on campus would be familiar with our basic application design.

UCDArch was developed by CAES as a common basis for all their internal development efforts. Written in C# .NET, it incorporates ASP.NET MVC as the web front-end, the NHibernate object relational mapper
for database persistence, and dependency injection with Castle Windsor. As an attempt to foster collaboration across campus, they published their framework on CodePlex and publicized it on campus. Although the Law School was developing apps exclusively in C#.NET, the new architecture represented a significant change from the ASP.NET Web Forms, strongly typed DataSets and SQL stored procedures we typically employed. Our initial development efforts were focused on comparing these approaches and figuring out the best way to make use of the new architecture. We discovered that the separation of concerns within the Model View Controller pattern and the ability to safely and dynamically construct SQL queries using NHibernate and LINQ made UCDArch a flexible and powerful tool for development. It also gave us the best possible chance of engaging other departments on campus to collaborate on the project. UCDArch was later moved to a UCD team GitHub site which they set up to share with other campus departments.

Further following the lead of CAES, we joined them in moving COWS source control to their UCD GitHub site. Although it was an effort to convert our source control history and learn how to use Git effectively, it paid off by making collaborative development possible and even fairly easy, as opposed to the painful effort of sharing code from a closed system available only to the Law School. A few initial coding sessions with other departments have already proved fruitful and provided new functionality to COWS. Future efforts are planned to deliver functionality updates desired by other departments. As a result, COWS should become useful to more departments across campus.

A Platform for Future Plans

The overall goal of COWS was not just a resource calendar, but a platform for creating organizational efficiency and improving business processes. Making COWS flexible enough so that other tools could be integrated was fundamental to the overall design. We have demonstrated this integration already with our digital signage system, the jQuery Calendar plugin, and LDAP user import. Our future plans extend the platform by interfacing with tablet computers, an interview recording program, and MediaSite lecture capture.

We have already developed an Android tablet app to display a single room’s daily schedule and plan to install them outside classrooms and meeting rooms. An extension to COWS will allow users to schedule time directly on the tablet based on business rules defined by the COWS Administrator. Users can identify themselves by swiping their ID card. Another extension to COWS could allow a requester to directly schedule a recording of the event in rooms equipped with a MediaSite recorder.
Filter and subscribe to a set of events:

Reading the COWS calendar with Google calendar:

Law School LCD screen kiosks display a COWS JSON feed of events and announcements:

Law Students Association website uses the COWS calendar plugin to display Student Group events:

Defining an LDAP query to give all law school staff Requester status in COWS:

Month view
The Technology Utilized in the Project

The Community Web Scheduler is built in C# with .NET 4.0 and ASP.NET MVC2. Underlying application architecture “UCDArch” was provided by UCD College of Agriculture and Environmental Sciences. UCDArch provides a starting point for ASP.NET MVC applications including NHibernate ORM, Castle Windsor dependency injection, and other features.

Additional technologies used include:

- CAS plugin also developed by CAES for campus-wide authentication
- jQuery and jQuery UI for skinning, cross-browser compatibility, and plugin architecture
- Microsoft SQL Server 2008 R2
- Microsoft Internet Information Server 7
- VMWare virtual server for web front-end

Implementation Timeframe

- Fall 2009
  - Initial planning
  - Consulting with various campus stakeholders through PPM 200-45 process
- Spring 2010
  - Architecture Planning
  - Staff training on new technologies/methods
- Summer 2010
  - Development begins
- Spring 2011
  - Limited beta released to key Law stakeholders
- Summer 2011
  - Final Testing
  - Law School Go-Live
- Fall 2011
  - Continued development, enhancements, bug fixes
  - Adding new departments
- Winter 2012
  - Partner with UC Davis College of Biological Sciences
  - Partner with UC Davis College of Agriculture and Environmental Sciences
- Spring 2012
  - Working collaboratively with various campus development teams to add Exchange and Banner integration as well as resource reservation.
**Objective Customer Satisfaction Data**

“COWS is such a big improvement over the old system! It is so much easier to use when creating a new event. The recurring event option is especially helpful. Editing events is more efficient, in that, each user can edit their own events. Also, the ability to move an event from one classroom to another can be done by simply changing the room number, where before, the entire event had to be re-entered.

I love COWS! Ed has done a great job and welcomes suggestions for improvement! Ed is also a very patient teacher.” – Debra Hicks, Dean’s Office Assistant – UC Davis School of Law

“The COWS system allows you to view events in multiple formats and is color coded for quick reference. I like the ability to go back in and edit an event once it has been submitted. The notes section is also helpful in communicating with the approver of the events.” – Gia Hellwig, Events Manager – UC Davis School of Law

“A web-based calendaring system that provides the ability to announce major events for the college as well as room reservations has been needed on this campus for a long time. CBS has been using the COWS calendaring program developed by the Law School now for 6 months and we feel that this has great potential to meet our growing needs for not only the Dean’s Office, but for the whole College. With COWS we are able to combine several independent scheduling systems into one. In addition, by making the source code available to other units, our developers are able to contribute to the project, to allow the system to more completely meet our specific needs. Ed and Jason have made a huge contribution to campus communication and collaboration efforts.” – Susan Sainz, MSO – UC Davis College of Biological Sciences

“Evaluating technology is part of our daily routine, and when we find something with the potential for broad use across campus, it’s very exciting. The digital signage system in the corridors of King Hall generates exactly that kind of excitement. The display layout is elegant, making an array of information easily accessible at a glance: room and event schedules, public announcements, local weather, news tickers and more. There are interactive displays as well, which provide museum-quality exhibits, way-finding, and other information germane to the school’s visitors.

All of this is icing, but the cake is COWS, the system’s database and back end management. Internet portals have been made available to students, faculty and staff, giving them appropriate access to publish their event information, announcements, etc. with ease. We’ve evaluated systems from major manufacturers like Panasonic, Sony, and Samsung, and none of them has measured up to the system
created at King Hall. I believe the COWS system should be given consideration as a model for a campus-wide standard.” – Derald Reedy, Project Manager – IET A/V Engineering

“It’s been a joy working with Ed and Jason on the Community Web Scheduler. We in the College of Agricultural & Environmental Sciences see this system potentially replacing a half-dozen disparate room scheduling and reservation systems, and it will bring with it the ability to widely publicize seminars, allow student groups to reserve conference rooms locally, and significantly reduce the workload on administrative staff. Our thanks to Ed and Jason and the School of Law for developing such a comprehensive system, and for going the extra distance to add in features that make it of broad use to the campus at large.” – Adam Getchell, Director of IT – College of Agriculture and Environmental Sciences