

## Gina Anderson

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**From:** Gina Anderson  
**Sent:** Friday, June 17, 2011 3:43 PM  
**To:** Jeff Barrett  
**Cc:** Academic Senate Chair; Dave Shelby  
**Subject:** RE: Administrative Systems Review (200-45) - Pre-Purchasing System

**Follow Up Flag:** Follow up  
**Due By:** Friday, September 23, 2011 9:30 AM  
**Flag Status:** Flagged

Dear Jeff,

I have corresponded with Pat Conners. Based on her description of the impact on PI's and faculty in general, I respectfully request a delay allowing the Academic Senate to fully and thoughtfully review the proposal in fall quarter. I did write to Pat indicating I would make this request.

Best wishes,

Gina Anderson  
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**From:** Jeff Barrett [mailto:[jtbarrett@ucdavis.edu](mailto:jtbarrett@ucdavis.edu)]  
**Sent:** Thursday, June 16, 2011 3:28 PM  
**To:** Gina Anderson  
**Subject:** Administrative Systems Review (200-45) - Pre-Purchasing System

Hello Gina,

We'd like to invite the Academic Senate to participate in the following review under the 200-45 Administrative Computing Policy:

Project: **Pre-Purchasing System**  
Sponsor: **College of Agricultural & Environmental Sciences**  
Details: <http://admincomputing.ucdavis.edu/projects/pre-purchasing.cfm>

Overview:

The Pre-Purchasing application is intended to provide a streamlined, electronic pre-purchasing process to allow student, staff, and faculty to easily purchase supplies and other equipment needed for their work. The system is intended to provide for a simplified workflow that ties into Quali KFS in such a way that users of the system do not need to understand the details of the Quali system, and users of the Quali system can make all appropriate authorizations and notes without having to directly login to the Pre-purchasing application. The primary goal is ease of use for a wide-ranging client base from lab managers to faculty to account managers to IT reviews for equipment to department purchasing assistants.

The system is intended to incorporate processes and ideas that have been implemented in existing pre-purchasing applications, but with an eye towards general usability for the entire campus. As such, it is an optional replacement for various electronic and paper-based systems.

Status:

- As part of the conceptual 200-45 review process for this project, we are seeking a brief statement summarizing the Academic Senate's feedback/position regarding the proposed system. You can send any Senate feedback directly to me, in whatever electronic format (Word, PDF, etc.) is most convenient for you.
- As with other projects, 200-45 provides a venue for ongoing review and discussion. In addition to a formal Academic Senate response, direct comments from Senate members are always welcome. (As previously discussed, we are careful to distinguish between individual comments and the official positions of campus organizations.)

Best Regards,

Jeff

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Jeff Barrett  
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Administrative and Resource Management / Information and Educational Technology  
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530-754-5666

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If members wish to comment directly, we have established a SmartSite for 200-45 project reviews. For those who have not yet joined, directions for signing up and participating are as follows:

#### To access the 200-45 Review SmartSite

1. Go to SmartSite (<http://smartsite.ucdavis.edu>) and select the **Log In** button in the top right corner.
2. Enter your UC Davis LoginID and password.
3. The first time you access the site, you will need to join the 200-45 Review site so you can participate in the discussion forum.
  - To join, click **Membership** under the My Workspace tab in the top left corner.
  - Select **Joinable Sites** at the top of the Membership window.
  - Select **Join** under the **200-45 Review** entry. (The site list is alphabetical, so it should be near the top.)
  - You now should see a **200-45 Review** tab to the right of the My Workspace gold tab (or in the More pull-down menu in the upper right corner).
4. Click on the **200-45 Review** tab to enter the site.

#### To provide feedback or ask questions regarding a project under review

1. Within the 200-45 SmartSite, choose **Project Forums**.
2. **Select the specific project** (called a Topic in SmartSite) that you would like to discuss.
3. Within a Topic, you can choose **Post New Thread** to add new comments or questions.
4. To contribute to an existing discussion or respond to a question, select the item of interest and choose **Reply**.

You can also pose questions directly to the project contacts; they are listed on the project page referenced above.

(For examples of previously submitted projects and feedback, please see <http://admincomputing.ucdavis.edu/projects/>.)

Be green - please print only when necessary

# College of Agricultural & Environmental Sciences

## *Pre-Purchasing System (Purchasing)*

*Content: Adam Getchell, Director of Information Technology, CA&ES Dean's Office*

*Executive Reviewer: Thomas Kaiser, Executive Assistant Dean, CA&ES*

*Technical Reviewer: Scott Kirkland, Senior Application Architect, CA&ES Dean's Office*

*Business Reviewers: Patricia Conners, Chief Administrative Officer Cheddar Cluster, Ag & Resource Economics, Environmental Science and Policy, Human and Community Development, Landscape Architecture;  
Tracy Lade, Department Manager, Physics Department*

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### **Description/Overview:**

The Pre-purchasing application is intended to provide a streamlined, electronic pre-purchasing process to allow student, staff, and faculty to easily purchase supplies and other equipment needed for their work. The system is intended to provide for a simplified workflow that ties into Quali KFS in such a way that users of the system do not need to understand the details of the Quali system, and users of the Quali system can make all appropriate authorizations and notes without having to directly login to the Pre-purchasing application. The primary goal is ease of use for a wide-ranging client base from lab managers to faculty to account managers to IT reviews for equipment to department purchasing assistants.

The system is intended to incorporate processes and ideas that have been implemented in existing pre-purchasing applications, but with an eye towards general usability for the entire campus. As such, it is an optional replacement for various electronic and paper-based systems.

Extensive cooperation with Accounting and Financial Systems will be needed in order to provide for an appropriate Application Programming Interface (API) that will allow transactions to be passed back and forth between the Pre-purchasing system and Quali KFS.

Notification, access rights, and roles can be managed in a decentralized way by delegating permissions to an Administrative role, which has the ability to create users, grant roles, and setup certain business rules and notifications on a per-unit basis. Purchasing responsibilities may span numerous units, and application role access can be granted to anyone with a Kerberos ID (which can be obtained for users outside of UC Davis via the temporary affiliate form).

Workflow is intended to be handled via email notifications. Users of the system will receive status and reminders visually within the application as well as via email and the system will generate and transmit email in response to defined workflow actions by specified roles.

### **Business Need**

Following the lead of the Administrative Application Development Initiative pioneered by ADMAN, a generalized campus pre-Purchasing system was selected to be the first application to pilot the idea of streamlining workflow and increasing efficiencies while leveraging technology. This followed after

extensive discussions and an inventory was collected of existing and desired business/administration applications across campus.

Please see the included document – Administrative Application Development Initiative – for further details.

### **Stakeholder Value**

To maximize stakeholder value for the new pre-purchasing system, a Steering Committee has been appointed, to be chaired by Patricia Conners, Chief Administrative Officer of the Cheddar Cluster in CA&ES. Please see the attached document – Steering Committee invitation – to see the list of committee members.

The Steering Committee will first and foremost, determine the functional specifications of the system and the base template of the system, which will be chosen from one of several existing pre-purchasing applications that will be demonstrated at an upcoming Town Hall meeting on June 3, 2011. Once the templates and specifications have been decided, the Steering Committee will continue to meet regularly with the programmers developing the pre-purchasing system, who will work in “sprints” of 2-4 weeks in length. Each “sprint” will consist of developing the features identified by the Steering Committee as the top priorities for that timeframe; and the meetings between the Steering Committee and programmers will validate or modify the progress of the work done up to that point in time.

In addition, a user feedback system, UserVoice, will be employed to give users of the pre-purchasing application the ability to provide direct feedback and vote for new features or fixes. UserVoice allows a customer to give specific feedback and vote on the priority of desired features. This feedback will be collected and presented to the Steering Committee for final approval. When a feature is implemented, all users who voted for it receive their votes back so that they can vote on their next desired feature or fix.

The goal of this undertaking is to provide an agile, responsive development process which incorporates feedback at all stages of application development so that the stakeholders get the most generally useful application possible. The Steering Committee may convene further Town Halls as needed to garner further campus input as the pre-purchasing application takes shape.

### **Business Impact**

The end result should be a pre-purchasing application that is easy to use, requires minimal training, and handles previously cumbersome business processes efficiently. Furthermore, we hope that by keeping the application development process open and transparent, and the codebase itself freely available, this initiative is extremely responsive to the needs of its end-users and amenable to further changes as other needs surface.

### **Infrastructure and Application Architecture**

The application will be composed of common building blocks developed from best practices.

Many of these best practices are handled by UCDArch, an application development infrastructure which provides for:

- Authentication using Yale's Central Authentication Service, or possibly Shibboleth if the proper application programming interface (API) is available
- Authorization using CatBert, a roles management system using a Service Oriented Architecture (SOA) to pass information between web service endpoints
- Security features include strong input validation and cross-site scripting (CSS) attack protection
- An object-relational mapper (ORM) which passes data between data classes and relational database systems such as Microsoft SQL Server or Oracle
- Use of the Model-View-Controller (MVC) framework, which handles data, user input, and user interfaces in a stateless model which works efficiently within a web application framework
- Highly customizable and friendly user interfaces (UI) using jQuery, HTML5, and other tools

At present, the physical layers of the system will consist of a web application front end and database back end, separated by firewalls with "default-deny" ingress and egress rules, housed in the Data Center. If the load on the system exceeds current resources, additional requests for further infrastructure for the working version may be made in the future.

The system will have security features built into the system, including SSL certificates for encrypted communication, client and server side data validation, business object validation and database consistency, and separated database access accounts.

Finally, the system will be developed using test-driven development, with software tests for essential functionality integrated into the build-compile cycle using TeamCity, and the use of an open source-control/project management based on GitHub and Git. Access to the code itself may be granted to interested developers, who will be able to contribute changes for review by the lead programmers of the pre-purchasing application.

### **Administrative Integration**

The system will integrate extensively with Kualu KFS in order that Accounting and Financial Services staff can appropriately integrate purchases made with the pre-purchasing application in Kualu KFS using their regular business process. Kualu KFS and the pre-purchasing system will exchange messages in order to verify transactions for users of both systems, in addition to email notifications.

### **Timeline and Budget**

A Town Hall to determine the base template for the pre-purchasing system will be conducted on June 3, 2011. We anticipate approximately 6 months of work on the system once a final set of specifications has been determined by the Steering Committee, using programmers from the CA&ES Dean's Office, Division of Social Sciences, School of Law, Department of Plant Sciences, and other collaborators. We anticipate several more meetings with the Steering Committee after the Town Hall to finalize the system requirements.

The overall goal is to develop a system with minimal training required, although if the demand were present dedicated training videos and/or classes could be developed. (Dedicated training videos could be handled by appropriate programming staff.)

## **Risks and Mitigations**

### *Duplication of Effort*

By partnering with ADMAN and developing pre-purchasing under the auspices of a Steering Committee, we expect to garner appropriate business and technical feedback on the project. By using the Model-View-Controller (MVC) architecture, we provide for independent development, testing, and maintenance (separation of concerns) for the application logic (business rules) and user interface (UI). In using a Service-Oriented Architecture, we expect inputs and outputs to the system to be relatively straightforward to other web service consumers. By using an agile development process guided by a Steering Committee, we expect that enhancements to the program can be made efficiently and quickly, adjusting the functionality of the application without too much application development disruption.

### *Complexity*

The MVC and SOA software engineering approaches allow for radical rewrites of particular features to be made without disrupting the entire scope of the program. Agile development allows us to consult frequently with our customers to ensure that the application is evolving according to their business needs and practices. Strong guidance from the Steering Committee ensures that a broad base of campus users are regularly consulted, and the program evolves to meet business requirements. Test-based development provide our applications development team with the ability to make incremental, well-tested changes to program logic with confidence that it will not break other, existing functionality. We have used these methods in past application development, and continue to refine our programming techniques, processes, and knowledge to reflect industry best practices.

# Technical Overview

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## Assumptions

See attached Project Description

## Infrastructure

- Windows 2008R2/IIS7/.NET 4.0 application server front-ends
- SQL Server 2008R2 or Oracle backend
- Smtplib.ucdavis.edu for email delivery and LDAP lookup
- Kuali application programming interface (API)

## Development Tools

- Visual Studio 2010 Integrated Development Environment (IDE) free or subscription editions [<http://www.microsoft.com/visualstudio/en-us/products/2010-editions>]
- UC Davis GitHub repository with Git (Source Control, Project Management, Task and Bug tracking) [<https://github.com/ucdavis/Purchasing>]
- TeamCity Professional for automated nightly builds from daily source control check-ins [<http://builder.caesdo.caes.ucdavis.edu>]
- UserVoice for help desk ticketing, requirements gathering, and bug/feature reporting [<http://ucdavis.uservoice.com>]
- UCDArch enterprise library for data access [Object Relational Mapper for class→database translation and all database transactions, including granular tracking of database changes], input validation, security [<https://github.com/ucdavis/UCDArch>]
- CatBert v4 for distributed roles management Object Relational Mapper for class→database translation and all database transactions (including granular tracking of database changes) [<https://github.com/ucdavis/Catbert>]
- jQueryUI and HTML5.0 features where appropriate to enhance the user interface (UI) [<https://github.com/jquery/jquery-ui>]

## Data and Class Design

Forthcoming