Building a Web-based Course Approval System

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Introduction
In the spring of 1998, the Office of the University Registrar undertook a project to computerize the campus’s paper-based course approval process. This summary explains the development process, challenges, and both near- and long-range goals.

UC Davis is located in Davis, California (pop. 55,000), about 15 miles from the state capitol, Sacramento, and about 70 miles from San Francisco. Current enrollment is approximately 26,000 students, with anticipated growth to 30,000+ students by 2010. The campus has three undergraduate colleges, two undergraduate divisions, Graduate Studies, and four professional schools (Graduate School of Management, School of Law, School of Medicine, School of Veterinary Medicine). UC Davis operates on the quarter system, except for the School of Law (semesters).

Courses
We have almost 8000 active courses in the student information system. Courses are approved and enacted year-round, with average turnover of about 10% per academic year (range=7-25%). All courses go through a review process based on a paper form and several review committees; however, the review process is different for each college, division, graduate program, and professional school.

Historical Course Approval Process
The historical system is a 30-year-old paper-based form and process, wherein staff or faculty type (on a typewriter) their course information on a 5-part NCR form. The form is one side only of an 8.5” x 11” page and lacks sufficient room to record basic required information. Additional pages with the expanded course description (ECD) are stapled to the form. Then this sole official copy travels by interdepartmental mail to various review committees, where each member must read the form (or a photocopy) and all its attachments. Four offices keep copies of the form: Registrar’s Office (official record), Academic Senate, Dean’s Office, Department Office.

Room for Improvement
“Request for Approval of a Course” forms are NCR bond, which cannot be recycled or erased/corrected. Departments must purchase forms and supply photocopies of all documents for the college committees. Documents get lost, misplaced, worn out. Changes noted on one copy may not be transmitted to others.
Idea for Change
Use existing technology to build a Web-based Course Approval system:
• Computers—not typewriters
• Cut-and-paste—not white-out
• Electrons—little or no paper
• E-mail—not memos and campus mail
• Single, permanent, accessible archive

Why the Registrar’s Office?
The Registrar’s Office is the office of record for courses. We publish the General Catalog and Class Schedule, and maintain the Student Information System course and class records.
The Interim Registrar was pressured—successfully—by the Academic Senate Committee on Courses and upper-level management. The Catalog Editor (K.Hunter) and Programmer/Analyst (C.B. Redder) “volunteered” for the project. No other resources were allocated. No committees were formed. The concept was “endorsed” by upper-level management and then “inherited” by the new Registrars.

Approach and Design
All design was done by the Catalog Editor and the Programmer Analyst, based on a shared long-range vision for services. The Editor used 7+ years experience with courses and the catalog and an understanding of the Academic Senate’s rules and goals to establish the conceptual framework. The Editor researched the habits and procedures of departments and courses committees and created a storyboard for the Web form and routing designs, from which the Programmer designed freely.
They collaborated frequently and informally on an as-needed basis on every aspect. Neither consulted with end users or with management on design or requirements.

The goals of the Academic Senate Courses Committee were clear:
• Remote access: eliminate travel around campus and restricted viewing times; more than one member able to view forms at any time; reduced paper and photocopying; screen projection in future
• Better data collection
• Streamline review of the administratively shared Division of Biological Sciences
• Guarantee of receiving required Expanded Course Description
• Easier to edit
• Public access to the approved courses

We decided to develop in MS Access and deliver via Web using Allaire’s Cold Fusion/NetObjects Fusion, because these resources were available, compatible with existing services, and the programmer’s has a high skill level in both.

Functionalities
A central requirement was platform independence. Users access system on Mac or PC with Internet Explorer or Netscape from on or off campus.
Field-based data collection in the form reduces error and improves data collection, as do validation tables, used whenever possible. The system generates automatic e-mail notifications of routing actions (receipt, rejection, approval).

Some of the Features
• Automatic “Save” and a “Saved” status to allow for work interruptions, etc.
• Date stamps
• Users can have multiple accounts, each at different levels
• Printable course summary (“form”)
• Sortable lists of in-progress courses
• Online status check
• Cut-and-paste capabilities
• Controls for limiting course lists for committee members to review

How Does It Work?
Routing is the key to automating the approval process and generating the e-mail notifications.
The routing is determined by (a) the user’s level, department and college/school, (b) the routing path for each college/school, and (c) the course level itself (whether undergraduate, 0-199; graduate, 200-399; or professional, 400-499).
User level controls system privileges. At the department we have two user levels: Users and Chairs. Both can use form to create, edit, or delete course requests and can save and submit. Chairs can also use the User Manager and receive the e-mail notifications.

At the College/School dean’s office we have two levels: College and Dean. One Point-of-Contact person (POC) controls committee view of the list, receives the e-mail when a department submits a course, edits forms, and submits courses to the next level.

At the Graduate and Academic Senate Committees on Courses, users are Campus level and a Point-of-Contact controls which courses show on the list, receives the e-mail when a college/school submits a course, edits forms, and submits to next level.

At the Registrar’s Office, the Editor receives the e-mail when the Academic Senate submits an approved course. Acting as a POC at the Campus level, the Editor can edit forms, retrieve the course description extract, and submit forms to the administrator. Administrators can view all users and forms at all levels.

Development Decisions
We definitely wanted the system to serve the broad campus community, despite differences between the colleges, schools, and committees, and without interfering with internal processes.

Security in accessing the system is moderate (content is not confidential), but within the system, controlling access rights is complex, requiring privacy for drafts and comments, and controlled privileges for viewing, editing, deleting, routing.

Distributed user management was an important administrative decision. Departments and colleges control their own users.

Development Timeline
Our timeline basically started at an April 1998 meeting and a “beta” pilot release was done in March 1999. Version “2.0” was released October 2000. Ongoing feature will be added in the next several months.

• Develop a separate “Signatory” function
• Improve the Course Summary (pdf ?)
• Better navigation through lists
• Restore privacy to annotations
• Administrative reports and values access
• Change to conform with campus log-on goals
• Restore User Addition feature
• Improve course “extract” for publications

Implementation Challenges
One thing we didn’t anticipate was the system’s immediate acceptance. We could not meet development demands in a timely way after the pilot rollout. We also didn’t anticipate the problems POCs and their committees would experience during peak use periods.
Within the system, we started with too few pathways and didn’t use the system to separate courses going to Graduate committee vs. the Academic Senate committee. Enhancements for version 2.0 focused largely on improving queuing, sorting, date stamping, and controlling meetings.
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Database Tables (MS Access)

Document Tables (contain all the information specific to each course approval request)

- CAFMAIN – this table contains all the data pertaining to the first page of the course approval request.
- CAFECP – contains all the data pertaining to the expanded course description.
- CAF_ANNOTATE – contains all the annotation data on a per document basis.
- CAF_MATRIX – provides the relationship information between subject, department and college.

Routing Tables (contain the course routing history and maps)

- CAF_PROCESS_TREE – this table contains the routing information by college and course level.
- CAF_ROUTER – contains the current location of the course approval request within the process.
- CAF_ROUTER_HISTORY – a complete routing history for a given course approval request.

User Tables (contain the user access and permissions data)

- CAFUSER – contains the unique listing of authorized users.
- CAFUSER_DETAIL – the department-related information per user; one user can have multiple departments.

Audit Tables (contain audit trail information for users and documents)

- CAF_AUDIT – the audit trail of edits, submits and rejection per document.
- CAF_USAGE – records usage information per user.

Validation Tables (contain the acceptable list of values for key fields)

- CAFDEPT – valid department values
- CAFGROUPS – valid college designations
- CAFLA – valid lists of activity codes
- CAFMAJ – valid lists of majors
- CAFQRTR – valid list quarter descriptions (i.e. Spring Quarter)
- CAFSUBJ – valid list of subject codes
- CAF_CLASS_CODE – valid list of class codes
- CAF_CONTROL – used to control status of the course approval site (two values on/off)
- CAF_REGSTATUS – valid list of registration status codes
- CAF_TERM – valid list of term codes

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