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ABSTRACT

ERes, an electronic reserve system, allows faculty and staff to make documents available on the World Wide Web without requiring any technical skills. The system was developed at Santa Clara University (California). This paper provides an overview of ERes and includes: technical information; the user interface for entering and viewing documents; features and functions of the program; system administration; and the experiences of the faculty, staff, and students who have used ERes at Santa Clara University. ERes makes use of short, intuitive, on-screen forms together with a point-and-click interface to make it quick and easy to put documents of any format--word processor files, Excel spreadsheets, and handwritten homework solutions--on "reserve" on the World Wide Web. The structure of the ERes system is built around the academic course--every course in the system has its own "page," which can be customized to suit the needs of an individual course or instructor. Instructors can post announcements and other information, as well as create links to other Web resources. The ERes system was designed to require no day-to-day maintenance--a system administrator is required only to create and delete instructor accounts. Santa Clara University faculty feedback on ERes indicates that they appreciate the ease of use the system affords, and enjoy the ability to make course material instantly available. (SWC)

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ERes - a Web-Based Electronic Reserve System

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Abstract

ERes, an electronic reserve system, allows faculty and staff to make documents available on the World Wide Web without requiring any technical skills. The system was developed at Santa Clara University and has been in use there for almost one year; nine other institutions are also using ERes. An overview of the features of ERes, the user interface, and the experiences of the faculty, staff, and students who have been using ERes at Santa Clara University will be presented.

ERes makes use of short, intuitive, on-screen forms together with point-and-click interface to make it quick and easy to put documents of any format - word processor files, Excel spreadsheets, and hand-written homework solutions, for example - on "reserve" on the World Wide Web. The structure of the ERes system is built around the academic course: every course in the system has its own "page," which can be customized to suit the needs of an individual course or instructor. Instructors can post announcements and other information, as well as links to other Web resources in addition to regular documents. The ERes system was also designed to require no day-to-day maintenance.

Introduction

The ERes system was developed at Santa Clara University, starting in the fall of 1995, as an outgrowth of the non-Internet reserve system in use by some science faculty at the time. That system, called "Notes," was limited to pure ASCII text documents, and could only be accessed by signing on to the main campus computer. It was the combination of an interest in making the system more widely accessible through the World Wide Web, and a need to distribute both formatted material and scanned copies of handwritten documents that spurred the design and creation of ERes.

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The first version of ERes was introduced in a beta test mode to a limited number of Santa Clara science faculty in the spring quarter of 1996. A significantly more powerful version of the system was built after that test; ERes version 2.0 was opened to the entire campus community in the fall of 1996. The main ERes v2.0 "splash" screen is shown in [Figure 1](#). The growth in the use of the system has been steady and dramatic: after just two quarters of campus wide use, ERes now serves documents for over 150 courses in 25 of the school's 37 academic disciplines. Nearly 20 percent of the full and part time faculty are using ERes to distribute course material to their students.

There are few secrets on the World Wide Web; search engines located ERes long before the first version was complete. A regular influx of inquires about the system lead to its availability for licensing by other academic institutions. At the time of this writing, ERes systems have been built for twelve other schools in Australia, Canada, and the United States, and the rate of new systems is about two per month.

Technical Overview

ERes is a documents database, managed by a suite of some 100 programs written in the Perl language. These programs, often called "cgi scripts," also write the hypertext markup language (HTML) which creates the interface screens displayed when a user visits the ERes Web site. Although ERes is a pure World Wide Web application, there are no permanent HTML scripts in the system: to provide the maximum functionality, every interface screen is created anew by the software in direct response to user input.

ERes can be installed on any computer which has been configured to run as a Web server, and which uses a Unix or Unix-like operating system. The only requirement beyond this is that the Perl language interpreter be installed on the machine. (The Perl software is available without charge on the World Wide Web at <http://perl.com/perl>.) ERes can therefore be installed on almost any existing campus or library Web server. However even a small machine, for example, a mid-range Pentium running the Linux operating system, is more than adequate for most college or university reserves systems.

Academic courses are the central element around which the ERes database is built. Using an authoring program built into ERes, instructors create and customize a separate Web page for each of their courses. These pages provide both the underlying structure of the database as well as the mechanism by which students and others retrieve documents and locate other resources associated with a course.

Entering and Viewing Documents

ERes was designed primarily to allow instructors and others to place a wide variety of course-related material on the World Wide Web quickly, effortlessly, and without having to know any of the technical details of computers, the Internet, or the Web. These goals have been achieved by the careful design of intuitive, point-and-click interfaces through which every ERes operation is carried out.

Instructors start by creating and customizing a course Web page using *Academic XPressPage*(TM), a page authoring application built into ERes. *Academic XPressPage* is tailored to the specifics of an academic course page, so an instructor only needs to fill in

two short, on-screen forms to complete the process. One of these screens is shown in [Figure 2](#). At each step, context-specific help is available on the same screen as the forms. (Context-specific help is available on every ERes function screen.)

Once a page has been created, ERes provides the instructor with a variety of functions by which documents can be added, document entries edited, and course page announcements posted or modified. The main "control" screen for all of these functions is shown in [Figure 3](#). As in the course page creation process, each of these functions requires the instructor to fill in one or two short, on-screen forms. A file transfer mechanism built in to ERes enables an instructor to move the actual document files to the ERes system with just a few clicks of the mouse button.

Any material placed on electronic reserve in the ERes system is listed on the Web page specific to the associated course; the description of the material entered by the instructor serves as a Web "link" to the document itself. Entries for resources outside the ERes system can also be added, and appear in the same course page listing. Students view documents - or follow a resource link - simply by pointing to the description of a document on the course page and clicking the mouse button. A sample course page in ERes is shown in [Figure 4](#).

Students can also make hard copy of a document, either through their Web browser's print command or through the printing mechanism of the helper or plug-in application used to view the document.

Other ERes Features and Functions

ERes provides faculty, staff, and student users with other features which make using the system easy and uncomplicated. Some of these are summarized below:

Simplified searching: The search engine built in to ERes allows any course page in the system to be brought up on the screen quickly, using either the course name, the instructor's last name, or a department name as a database key.

Security: All faculty-related operations, such as creating a course page or placing material on electronic reserve, are protected by a secure account, encrypted password system. Individual course pages can also be password protected at the instructor's option.

Seamless linking of scanned image documents: When a multi-page document is scanned into an image format, each page must be written to a separate file. ERes ties all of the pages of any multi-page, multi-file document into a single entity, so that users can move forwards or backwards in the document, either sequentially by page or in any other pattern as appropriate.

Bookmarking of course pages: Although all ERes course pages are database elements rather than HTML scripts, the system was designed so that users can set a bookmark (or hotlist or favorites entry, depending on the flavor of browser) and later return directly to any course page.

Lots of on-screen help: In addition to context-specific help on nearly every screen, ERes also includes a complete on-line manual which covers every aspect of the system.

System Administration

ERes does not require day-to-day maintenance; the only operations for which a system administrator is required are the creation and deletion of instructor accounts. An institution can choose, however, to manage the electronic reserve system from a central location, for example, the university library: ERes was designed with a full compliment of administrative features.

ERes provides three levels of administrative accounts. Any account can be assigned either "helper" or "assistant" privileges, and one account in the system ("Manager") has super user privileges. All three account levels allow a user to carry out actions on behalf of other users.

One Manager account exists in the ERes system, normally held by a single person designated as the electronic reserve administrator. In addition to having the ability to act on behalf of any user, the Manager can create accounts, make certain system customizations, and monitor aspects of system usage. No technical knowledge beyond the workings of ERes are required; for every version of ERes currently installed, the ERes Manager is either a faculty member or on the library staff, rather than a computer systems person.

The helper account level is intended to be assigned to students or other part-time staff in a university library or academic department, to allow them to add documents to ERes on behalf of other authorized users. Helper-level users can create pages and make document entries, but cannot delete documents or make changes to existing course pages. The assistant-level account is intended to be assigned to library staff and academic department administrative assistants, who require more flexibility to carry out ERes tasks than that offered by a helper account. A user who has been assigned assistant-level privilege can carry out all ERes operations on behalf of any regular user. Any number of users can be assigned helper or assistant privileges.

ERes Use at Santa Clara University

After only two full quarters of campus-wide availability of ERes, nearly 20 percent of the faculty at Santa Clara University are making use of the system. They have created pages for over 150 courses, spanning more than two thirds of the academic disciplines. Faculty in the Business School are the biggest users of ERes: every department in Business has course material on electronic reserve. In the College of Arts and Sciences, usage is evenly divided between humanities disciplines and those in math and the sciences.

At the time of this writing, the bulk of the documents on reserve in ERes are approximately evenly split between lecture notes, supplemental reading material, and homework solutions. Many faculty, especially those in the Business School, put spreadsheets of data for students to analyze into ERes. A few faculty have experimented with multimedia documents. It is also interesting to note that nearly all documents in the system so far were created by the faculty members, and therefore require no copyright clearance.

The Santa Clara Library does not yet participate in ERes. Since the system requires no

day-to-day administration, there has not been a driving need for the Library staff to get involved: faculty or their administrative assistants do all document entry themselves, and more and more departments are purchasing hardware with which to scan documents that don't already exist in a computer format.

There are more than 1,100 individual documents currently on reserve in ERes. This number is sufficient to allow for statistically meaningful statements about the materials that faculty are entering into the system:

- The 1,100 documents occupy approximately 0.14 Gigabytes on disk. This suggests that between 15,000 and 30,000 typical documents can be stored on the 2 to 4 Gigabyte hard drives available today.
- Documents are stored in a variety of file formats: 38% are images files created from scanning, 35% are word processor documents, 15% are data spreadsheets, and 8% are in ASCII text format. The rest of the documents cover a wide range, including audio and video files, and executable programs.
- Nearly all of the scanned images are in gif format; these documents comprise 2,300 separate files (pages.) The average document length is 4 pages, and most of page files are less than 50 kilobytes in size.

Summary

Faculty feedback on ERes indicates that they appreciate the ease of use the system affords, and enjoy the ability to make course material instantly available. Students, many of whom have computers in their residence hall rooms, have been clamoring for even more faculty to use the system. ERes is already considered a great success at Santa Clara University.

Individuals interested in exploring ERes can visit any of the ERes installations on the World Wide Web, including Santa Clara's, at <http://www-test.scu.edu/eres>. A guest login is available to allow password-protected screens to be displayed. More information on ERes can also be found at <http://www.docutek.com>.



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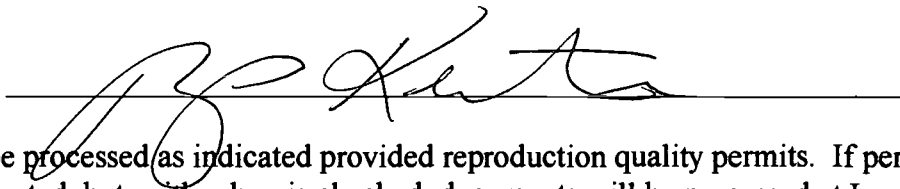
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