Graduate Admission Processing on the World Wide Web

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The University of Delaware is able to distribute up-to-the-minute information about graduate school applicants to forty-six authorized departmental admissions committee faculty and staff—whenever they want to access it, using their preferred workstation—through a newly developed Netscape-based decision support application. This article describes this World Wide Web application and its successful implementation.

Processing admissions applications from prospective graduate students presents institutions with interesting challenges. As more universities and colleges desire to take advantage of information technology, most of the technology-based innovations involve administrative tasks that are relatively centralized. However, at most institutions, graduate student admissions is a highly decentralized process, with each department or program establishing its own admissions committee. Typically, graduate school offices serve more of a coordinating function.

Clearly, such highly decentralized processing requires that whatever system is designed and implemented be easy to learn and use, have adequate security, and be customizable for specific situations.

This article reports the successful design and implementation of a new process for handling graduate applications at the University of Delaware using a Netscape-based application in conjunction with the University’s mainframe student information system, SIS/PLUS.

In brief, all graduate admissions are now facilitated by a World Wide Web application that has replaced paper flow with electronic work flow. The application uses a Web interface to distribute information to departments and to return decision information to the Office of Graduate Studies (Graduate Office) and the central administrative system. A process that once took two weeks now takes minutes.

The institution

The University of Delaware is a Research II comprehensive land-grant, sea-grant, and space-grant institution with an enrollment in 1995-96 of 15,400 undergraduates, 3,200 graduate students, and 2,800 students in continuing education. The University employs over 900 faculty in ten colleges.

Students and faculty use a high-speed campus network to access on-campus and off-campus computing and information resources. The central systems are accessible twenty-four hours a day, seven days a week via the network from many campus locations, including faculty and staff offices. Faculty and staff are connected via Ethernet to University computing resources. Dial-in access is also available from off-campus sites.

The problem

The University has forty-six departments offering graduate programs, and the admission decision is made separately in each department. Graduate applications are received centrally in the Graduate Office and entered into the admissions component of the mainframe student information system, SIS/PLUS. Until the development of our new graduate admissions application, the applications, transcripts, paper copies of graduate record exam (GRE) scores, and decision sheets were sent using campus mail services to the department for each applicant.

To further the University’s goal to recruit the best possible graduate students, and as a way to evaluate the existing method of processing applications, a full review of Graduate Office processes was done in June 1995. The study revealed numerous problems, including too many “touches” of the application materials by Graduate Office and departmental staff, long delays in
cAMPUS mail, and processing delays in entering departmental decisions into SIS/PLUS (which delayed the notification to students). In addition, departments were keeping their own lists of applicants and maintaining duplicate databases to keep information current. Data were being entered multiple times by different staff. The Graduate Office produced a summary sheet of applicant information and sent this to departments when new applications were entered; however, the data on the paper became obsolete as updates for test scores or degrees were received in the Graduate Office.

Each of these problems alone caused difficulties in the timely admission of high-quality applicants; cumulatively their effects were preventing many departments from competing effectively in a very competitive market. Additionally, many applicants received duplicate letters concerning admissions decisions due to problems in recordkeeping using paper forms; such duplication reflected poorly on the institution. Consequently, the Interim Associate Provost for Graduate Studies made a decision to create a technology-based solution to these problems.

The goals for improving the graduate admission process were:

- reduce the time it takes for information to flow between the Graduate Office and departments;
- eliminate the duplicate keying of data;
- create interfaces between SIS/PLUS database and World Wide Web applications;
- provide current information about applicants, with real-time updating;
- provide key data with sorting capabilities in one easy-to-read screen;
- create specialized rankings of applicants for departments with especially high volumes; and
- create electronic forms for admissions decisions that are sensitive to specific admission codes and department needs.

We needed to develop an application that would be acceptable to faculty and staff and easy to use. It had to run on Mac, Sun, and Windows platforms. The application needed a real-time connection to the legacy admission database to provide current data about new applicants. We wanted to keep cost and training to a minimum. Most important, we had less than twelve weeks for development before the graduate admission cycle would begin.

Software servers were in place on the administrative mainframe for delivering data to the World Wide Web. The Web browsers ran on multiple platforms and provided mixed-media display (text and images). Most faculty and staff were familiar with Web browsers, although specialized training in the new procedures would be necessary.

Timeline
A three-person development team started detail design in early October 1995. Weekly meetings allowed us to quickly refine the specifications. Our goal was to switch from the paper process to the Web processing by January 2, 1996. Two additional staff were added to the team on a part-time basis in December to incorporate real-time updating of SIS/PLUS. Four workshops were held to introduce the faculty and staff to the application in mid-December, and we successfully met our implementation goal on January 2.

The application
The graduate admission application consists of four reports, one detailed information sheet, comment input, comment review, admission form, financial aid offer form, rejection option and confirmation, change of degree/major/concentration form, and a deferral of admission form. Specifically, the application includes:

- daily e-mail notification to faculty and staff of new applications entered into the system;
- four Web reports—pre-decision processing, applicants with missing credentials, post-decision processing, and rejected applicants list;
- detailed data hyperlinked to each applicant’s name;
- electronic forms for admission decisions, financial aid offers, admission rejections, and comments;
- real-time updating of the central administrative system from Web forms;
- automatic Graduate Office notification by e-mail when a decision is made;
- GRE tape display with sorting capability;
- automatic department notification of updated information such as new GRE scores;
- applicant ranking algorithms that are customizable by department;
- list of applicants to be reviewed by specific committee members; and
- ability to download information into software packages for customization in individual departments.

All documents and electronic forms are displayed on faculty and staff workstations using either Netscape or Lynx. Netscape is the standard Web browser at Delaware because it has market share, supports SSL, and is available at no cost. Netscape can be installed on workstations by downloading from the network, eliminating the need for support staff to visit every office and

“The application was inexpensive to develop and deploy, and went from design to production in three months.”

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1 SSL (Secure Sockets Layer) is a proposed open standard for providing secure (encrypted and authenticated) service over the Internet.
install a specialized client. Lynx, a character-based browser, was used by the few staff who did not have workstations capable of running Netscape. Lynx was modified by the project team to incorporate SSL security.

The graduate admission application is secured in three ways: (1) Social Security number (SSN) and personal identification number (PIN) to provide authentication; (2) a table that associates an SSN with more than one major code and an access type to provide authorization; and (3) encryption to provide privacy. The application only displays applicants in the designated majors or concentrations within majors; for example, users in the clinical psychology program only see applicants to the graduate program in clinical psychology, and no other applicants to other programs in the psychology department.

The application also supports three access types: view-only, decision-maker, and omnipotent. The view-only class allows for reviewing the applicant’s data on file and for making comments to other reviewers and to the Office of Graduate Studies. The decision-maker class has additional options to admit or reject an applicant. The omnipotent designation is reserved for Graduate Office staff only, and allows them to enter any major code to review the applicant list in any department. These different classes are used to ensure faculty participation in the selection and admissions process, as stipulated in each department’s program policy statement. The SSN and PIN numbers provide the means to create an audit trail should there be any questions about the admissions process.

Data stored in the University’s mainframe student information system are easily downloaded using end-user reporting tools into word processing and database applications. In this way, departments and administrative offices can create customized reports and correspondence without having to re-key all of the information.

How it works

Each time a graduate admission reviewer or coordinator uses the graduate admission application, a program on the University’s MVS mainframe reads the SIS/PLUS admission file and returns a hyperlinked list of every applicant currently in the file for a designated major. When the reviewer clicks on an applicant’s name, another program generates the information sheet for that applicant. The information sheet includes demographic information, the application status, undergraduate and graduate institutions attended, GPA, degree, major, concentration, and test score information for each testing occasion. The information sheet is generated in real time and includes up-to-the-minute information about the applicant. For example, an e-mail is generated to departments if new test scores become available. The information sheet also provides detail as to whether degrees are pending or have been conferred, whether test scores are official, and whether letters of recommendation have been received.

An additional feature pertains to situations in which students apply to multiple programs. In such cases, the graduate admission application shows only the application data relevant to the specific reviewer. New and previously unreviewed applications are denoted by an asterisk before the name. Additionally, the data are matched with requirements specific to individuals, such as certain special requirements for foreign students. There is also a built-in notification system in the event of a systems failure.

Several additional helpful types of information are included on the pre- and post-decision lists. The pre-decision list provides a snapshot of the applicant’s admission status (complete or not complete), admission term, and application date. The post-decision list includes two important pieces of information in addition to the admissions action: whether or not a required form has been sent to foreign students, and the student’s response to the admissions offer.

Admission offers, financial offers, and rejections are instantly updated in SIS/PLUS for viewing by the Graduate Office, department, Financial Aid Office, Cashiers Office, Accounts Receivable, Foreign Student Services, and Public Safety. Interfacing to a screen scraper program that is part of our interactive voice response system gives the University the ability to populate data on a screen just as an operator logged onto SIS/PLUS would do. This technology gave us the ability to do real-time updates rather than relying on batch transactions taken in overnight.

Evidence of success

During the 1996 recruitment year, the Graduate Office has processed more than 4,900 applications. Well over 2,000 final admission actions were made in that time period using the graduate admission application for a savings of many person-hours. The paper information sheet is no longer generated and mailed to departments. GRE paper test scores are no longer mailed to departments. Admission and rejection actions are no longer done manually, and there is no need to manually open envelopes returned from departments and enter the admissions action in SIS/PLUS.

In the department, manually maintained lists of applicants are a thing of the past. An up-to-the-
minute (literally) list of applicants is available by clicking on hyperlinks to pre-decision, post-decision, and rejected status. Accuracy in the processing of applications has increased significantly; the Office of Graduate Studies has found far fewer processing errors with the new system as compared to the old paper system. Additionally, departments have reported having a much easier time tracking applicants whose addresses change, as the system permits continual updating of this information.

It is no longer necessary to make separate mailings to Foreign Student Services, the Financial Aid Office, or Cashier’s Office to inform these units of pending funding offers. These units have access to screens in SIS/PLUS where funding type, tuition percentage, and stipend amount display moments after the offer is made through the graduate admission application in the departments.

Future directions and conclusions

We are currently working to expand the electronic processing to include transcripts and letters of recommendation. The plan is to begin a pilot project in which these materials will be imaged and linked to the existing electronic files. Thus, faculty on admissions committees would have all of the key components of the files available electronically for their review at their convenience. One of the challenges in this regard is the highly variable quality and physical size of transcripts. To date, we have successfully handled many of these problems, but scanning technology and other limitations currently limit the total conversion from paper to electronic media. For letters of recommendation, we have posted the forms on our Web site along with the various application forms.

In sum, the University of Delaware has successfully begun a conversion from paper processing and review of applications to its graduate programs to fully electronic files. We have already saved hundreds of person-hours, avoided roughly ten days of delay during recruitment per file due to campus mail, and documented significant cost reductions in paper and photocopying expenditures. We believe that this approach is easily transportable to other institutions, and has considerable potential in any situation in which review of files is done in a decentralized fashion.

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