The HiTech Web Advising System

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I. Problem Description

The University of Texas mandates a one-week period to advise students before registration for the upcoming semester. Many of the components of the university allow students to self advise, but the College of Engineering requires students to be advised in their resident departments and an electronic “bar” is placed on the student’s access to the registration system until the advising is completed.

The Department of Electrical and Computer Engineering (ECE) has an inadequate number of trained advising specialists to accomplish this task, so we must conscript the entire faculty and seek assistance from volunteer student advisors from a student honor/service organization. The result is poor quality control: some faculty and peer advisors are conscientious and well informed while others will approve any proposed courses without reviewing the student's past performance, checking prerequisites or observing any such precautions.

It is hard to fault the temporary advisors, because even with the best of intentions it is difficult to keep up with all the factors that might bear on a student's course selections. Let us mention a few categories of relevant information required:

- Catalog requirements are revised every two years.
- Prerequisites exist for most courses, and these change over time as well.
- The ECE Department requires a 2.5 GPA on core freshman and sophomore courses (basic sequence)for students to advance to junior-level courses (major sequence). Freshmen and sophomore students who are not performing above this standard need special attention.
- Electives must satisfy ABET, university, and departmental requirements.
- All ECE students must take twelve semester hours toward the degree and fourteen hours overall. Advisors musts ensure these limits are met with legitimate courses.
- Advising information is found in the Course Schedule issued each semester, the University General Information Bulletin issued every year, the College of Engineering Catalog revised every two years, and departmental policy statements. The most important information is extracted and organized in a "Notes for ECE Advisors" every semester. In principle all this information is available to students and advisors, but in practice only the trained advisors attempt to keep up with these details.

We will not belabor the importance of thoughtful, informed advising to this audience. Bad advising often translates into wasted time and resources both for student and department, and can yield frustrating experiences for the student.

In summary, our problem is that we must advise too many students in too little time with undertrained advisors. This paper presents our progress in developing an alternative.

II. The HiTech Advising System

The basic idea is to use modern technology to perform the routine aspects of such advising, thus releasing the trained advisors to deal with the nonroutine problems and releasing the faculty to do what they do well, the professional/career-oriented advising. Our goal is to have students be advised over the World Wide Web (the web) in the routine aspects of course selection with a system that simulates interaction with a trained advisor.

Overview of the HiTech System from a student's viewpoint

- The student is reminded by email of the need to be advised for the upcoming registration period. The student is informed when and where to be advised in person. The alternative of being advised by HiTech is offered (when and URL), and the student is urged to use HiTech if he or she has no particular advising problems or questions.
- The student logs into the system through the university security system.
- The student is asked to confirm or correct displayed personal information from the university and departmental databases. Such information includes address, phone, email address, catalog year, degree program, basic/major sequence status, and expected graduation date.
- The student is presented with his or her official academic record to date. This record includes transferred courses, residential courses completed satisfactorily, and courses underway during the present semester. The information format displays progress toward graduation.
- Students are allowed to improve the accuracy of the information by typing in courses for which they have or expect credit by transfer, substitution, or advanced placement exams. These inputs are accepted for advising purposes, without affecting the official records.
- Students are then presented with the updated information but with added clickboxes by every course for which the student is eligible in the upcoming semester. The system uses frames to offer instructions and useful links, and has drop down lists for some categories of electives.
- The student chooses courses from this menu and asks the system to accept the chosen slate of courses. The system checks corequisites and course load. If all requirements are met the information is logged and the student is invited to confirm and logout. If corequisites are not met, the student is given the opportunity to modify his or her choices. If the required course load is not met, the student is invited to choose more courses or else type in an explanation of why part-time status should be approved.
- By some means, the student either satisfies system requirements or chooses to quit the program to talk with a trained advisor.
- Students who get approved receive emails confirming their selections and announcing the removal of their registration bars.

Overview of HiTech system from the viewpoints of the ECE advising office

- Early in the semester, student information is downloaded from the University mainframe computer and combined with departmental information in a local database.
- Prior to the period during which HiTech will be available, the information required by HiTech is exported as a text file and Fetched to the HiTech server, where the information is parsed to form a flat file database of individual student records.
- An email message is sent to all students announcing the availability of HiTech.
- During the period when HiTech is available, the records of student use are downloaded, reviewed, and printed out for hardcopy storage.
- Students with approved schedules are informed by email and their bars to the registration system is removed. Students with unacceptable schedules will be contacted to come in for advising (this has not happened to date).

III. Some technical details.

The HiTech Advising System offers confidential student information such as local address and academic records over the web, so security measures are mandated by privacy laws. Two types of security are used in the system, encrypted transmission and an electronic identification system.

Data Processing is offering student academic information over the web through encrypted transmission. The tn3270 encryption software can be downloaded to student-owned computers for encrypted sessions over the web with the Data Processing mainframe computers for a variety of services. We are using the same system in our department server for encrypted sessions with HiTech. For security purposes, the system will logout the user after 30 minutes of inactivity, and does not allow more than one login from a user at a time.

When a student seeks to log into HiTech for an advising session, our server passes the login to the University system for verification. Upon validation, the login comes back to the departmental server and an encrypted link is set up directly between the student and the server.

The HiTech Advising System is being developed on the UNIX platform. Various parts of the system are coded in the C, PERL, and HTML programming languages. The database and system resides on the ECE Learning Resource Center machines and are accessible to students through the World Wide Web.

The academic data for students of the University of Texas at Austin resides on the Data Processing Department administrative mainframe, an IBM 3090, with data programmed in the NATURAL programming language. The student data required in the ECE Department local database are placed in files that are downloaded with the FETCH program to the Undergraduate Student Affairs Office over a local area network. The format of the data is compatible with FileMaker Pro, a database program. The required data are then FETCHed to the ECE LRC machines and parsed to create a local flat file database of individual student records.

PERL is used for the interface with the web, and C is used for the processing engine behind the web interface. Javascript and HTML are the languages are used to display information on the interface.

The HiTech system was developed by a team of ECE graduate and undergraduate students, working in relay fashion over a period of four years. The major contributors are listed as co-authors of this paper.

IV. Student acceptance.

The system was tested successfully with approximately 150 student during the fall of 1997, and student acceptance was very positive. We asked students to complete an evaluation form before exiting the system, and 57 students completed the form, with the following results: waste of time (1), some value (4), useful (13), very useful (25), a great system (14). All of the requested schedules were approved because the system approved only legal schedules.

V. Future development.

The current system simulates a session with a trained advisor in the sense of displaying and correcting information and approving student requests that satisfy a set of rules. Future versions will offer much more planning information, be proactive in prioritizing course possibilities, and allow planning for multiple semesters into the future. Work is also underway to develop a web-based administrative system to view, approve, and email students about their HiTech sessions.

VI. Summary

The HiTech Web Advising System currently offers routine advising services to authorized users over secure links. The system receives a student's course history and information such as catalog and technical area, displays the student status in the degree program, accepts additional information from the student and offers a menu of courses for which the student has the prerequisites. If the student clicks an acceptable selection of courses that satisfies courseload requirements, the choices will be logged and the student's advising bar will be cleared. Future versions will offer more information and assist optimal planning for future semesters.