Technology & Cooperative Education:  
A Survey of Current Technology and Future Plans  
At Selected Universities in the United States, Canada, United Kingdom, China, and Australia

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ABSTRACT  
A variety of technologies are currently used at universities to help coordinators manage their cooperative education programs. This technology, which runs the gamut from paper-based to sophisticated web-enabled database systems, is being influenced by revolutionary changes in the broader field of information technology. In order to understand what technology is currently in use and what is under development, this project surveyed selected co-op institutions in the United States, Canada, United Kingdom, China, and Australia.

PROCEDURE  
Representatives from twelve co-op institutions, who were familiar with the current use and future plans for the development of technology in co-op programs at their universities, were surveyed during 1998 and 1999.

Each was asked to describe: the co-op process now in place, current technology in use in the co-op department, information available on the World Wide Web, future technology plans, and locus of decision-making regarding technology issues. In addition, they also responded to the following questions: constraints holding back new technology, driving forces for change, and suggestions for WACE in supporting technological change.

Coordinators from the following institutions provided information for the survey: University of Cincinnati, Drexel University, Rochester Institute of Technology, Georgia Institute of Technology, Northeastern University, University of Waterloo, University of Victoria, University of Huddersfield, University of Ulster, Hong Kong Polytechnic University, Swinburne University of Technology, and University of Technology, Sydney.1

RESULTS  
Overall results of the surveyed institutions are described in this report. The focus is on the functionality of the information systems, rather than on computer hardware that they run on. Responses from Chinese and Australian institutions were not yet available at the time of submission, but will be included in the presentation.

Results of the questions about the level of the student’s computer skills were not included because there were virtually no reported differences with reasonably high levels of skill at all institutions.

Suggestions for WACE on how they might assist co-op departments in supporting technological change were sent directly to WACE and are not provided here.

1Editor’s note: This paper presents excerpts from the full Erickson study, which was published by WACE and is available from the Secretariat. Not every participating school is represented in this online preliminary version of the study.

FINDINGS  
Web Expansion  
• Universities are taking advantage of the capacity of the Internet’s World Wide Web in the design of new information systems. All universities surveyed currently have co-op Web pages.

• Originally, co-op Web sites tended to provide general information for students and employers. As Web designers have become more sophisticated, the documents available on the Web are becoming more specific and detailed at many institutions. For example, some Web sites provide lengthy manuals on-line to help students prepare for co-op and to understand how the co-op process works.

• In addition to the above, creative uses of the Web, such as on-line syllabi are emerging.

On-Line Database Access  
• Most units are creating ways for employers, students and co-op administrators to connect to sophisticated co-op databases on-line. Restrictions on access and available functions for each group vary by institution.

• Seven of the ten units now have most of their job descriptions available in some type of electronic form, (e.g. email, Web or Telnet) with three of the ten units currently posting positions on the Web. Nine of the ten units are planning to develop that capacity.

• All units surveyed, with the exception of the Division of Professional Practice at the University of Cincinnati, have or are implementing, systems which will allow students to access job descriptions online. Most will also allow students to post resumes on the system. University of Cincinnati’s resistance to this trend stems from philosophical and not technical issues.

• Older on-line job posting systems were usually separate from other information
Many old legacy mainframe systems are not year-2000 compliant and new systems currently being implemented will alleviate that problem. Once these are in place, co-op modules under development will allow connection and sharing of information.

Efficiency of Administration
- Increased efficiency, reduced staff input times, ease of administration and improved reporting functions.
- Linking registrar’s student records and demographic data with co-op data leads to less confusion and updating problems.
- Old systems are difficult to administer and are often not year 2000 compliant.
- Reduced printing and mailing costs.
- Web allows mix of PC’s and Macintosh machines.

Accurate Timely Information
- Providing consistent timely accurate detailed information to staff, students and employers that is easy to access.
- Providing academic faculty with better information.
- Meeting employer needs for faster identification of candidates and easier access to applicant materials.
- Remaining competitive, staying on the cutting edge.
- Increasing student numbers leads to the need to share information.

Ease of Use
- Focusing on student centeredness, making it easier for students to participate.

Other Benefits
- International co-op involvement can benefit from improved information online because of the distances involved.
- Supplying hard data on co-op and on learning outcomes can lead to increased support.

Driving Forces for Change
Results of the survey suggest that there are many common reasons for moving to newer, integrated, Web-based information systems. Summarized responses are listed below.
write the program in a modern language while maintaining the current functionality. In addition, the separate Co-op and My.files databases will be merged into one section, but access to My.files information will remain restricted to a particular coordinator.

The department is currently adding company Web URLs to each company datafile. Based on the philosophy that the coordinator is an educator, who has knowledge of every position and student levels of preparation, there are no plans to allow database access to students or employers at this time.

University of Cincinnati
Department of Professional Practice and Career Placement
College of Applied Science

Summary
The co-op information system for the College of Applied Science is based on a commercial product called 1st Place!. The module, which allows employer, student and administrator access via the Internet, is called Web Walkup.

The college operates on an alternating system, and Web Walkup allows students to enter an academic plan and schedule, showing work and school quarters. This Degree Plan is used extensively for academic advising. Student grade data is entered manually by co-op staff.

Students create resumes using templates, which can be printed, reviewed or corrected on-line. In addition to their resume, students add current demographic and academic data as well as employment qualifiers, employer types preferred, and location preferences to complete their registration section.

Employer information is also stored online. While contact information is restricted to the college's co-op staff, job descriptions are available to students via any Web browser. Most employers submit job descriptions by fax or phone, and they are typed into the system by co-op staff. Alternatively, employers may use an on-line email form, available on the Web, to submit descriptions. These descriptions are reviewed and approved by a Co-op Coordinator before they become available to students.

Once students view job descriptions and enter their selections, most resumes are faxed directly to employers from a fax server. Alternatively, employers can use a Web browser and an assigned password to view resumes directly on-line. Employers can view only resumes of students who have selected them.

In addition to employer and student access, the 1st Place! product also allows a wide variety of data collection and reporting functions.

Current Web Access
Web access is available for all components of the co-op information system 24 hours a day.

Technology Plans
There are no current plans to modify the existing system.

University of Waterloo
Cooperative Education & Career Services

Summary
The University of Waterloo is currently using a UNIX-based, home-built system from 1988, which will be replaced by summer 1999. They developed the matching algorithm adopted by Drexel University, University of Victoria and others. As part of this process, company offers to students and students ranking of employers are all entered into the mainframe by staff. After interviews are completed, results of the computer match determine the final job assignment.

Current Web Access
The department maintains an extensive on-line manual, which describes how the co-op and full-time job search process works at Waterloo. Additionally, resume, interview and general job search information is available via the Web.

Technology Plans
The University of Waterloo is currently in the process of moving all of its administrative, student demographic, and student record functions to a PeopleSoft enterprise-wide system. They are working with学术软件，Inc. to provide a customized co-op module, which will eventually interface with PeopleSoft allowing the sharing of demographic information between the two systems.

The Department of Co-operative Education and Career Services is a beta test site for a new customized product being jointly developed with ASI. The product will have similar functions to 1st Place!, delivering additional sophisticated Web based processes as described below.

Using assigned ID numbers and passwords, employers will be able to submit and update job descriptions, view resumes of students who have applied for their jobs, select students, and set up interviews. Furthermore, they will be able to rank students for job matching following the interview and to see which students have accepted their positions. A more sophisticated version of their current job matching system, based on employer rankings after interviews, is being added to the system to provide a real time offers process before the ranking algorithm is run.

Students will be set up on the system with information from the registrar's system, first from the existing VM system and then from the PeopleSoft system when implemented. Students will be able to load up to 3 resumes in the system; view, search and select jobs; and schedule interviews. Additionally, they will rank employers and view results of matches on-line. A pilot demonstration of the new system is in place as of February 1999 with an implementation due by spring 1999 for a small program and full implementation in the fall of 1999.

Decision Making
The proposal for Academic Software, Inc. to develop a customized system was initiated by Co-operative Education and accepted by Computing Services, after research by system analysts.
Drexel University
Co-op and Career Services
Summary
Drexel currently utilizes three different co-op computer systems that will be replaced by the system described under “Technology Plans” below.

Current Web Access
Drexel University maintains a co-op Web site with somewhat limited general information about co-op at Drexel. Currently, information for employers is more extensive than that available for students.

Technology Plans
Drexel is in the process of implementing a university-wide Oracle-based system called Banner 2000. Drexel contracted Academic Software, Inc. to customize the product that is now under development for the University of Waterloo so that it connects with the Banner system. (See University of Waterloo above.) The new system is tentatively called CMC on-line.

In preparation for the move to the new system, Drexel has begun a process of “cleaning up” the employer database to insure data integrity on the new ASI system.

Employers will be encouraged to access the new system via the Web. Each will be issued an ID and PIN number. They will be able to view or print resumes of students who have selected them. They will also use the Web to post their student selections, schedule interview rooms, and rank students after interviews are completed.

The matching system is also being revised and will be similar to the system being designed for Waterloo, allowing real time offers on-line after interviews are completed.

As of February 1999, it is not yet clear how much of the post co-op evaluation and assessment pieces will be integrated into the on-line system.

Decision-Making
The proposal to use the new program from ASI was made within the Department of Co-op and Career Services.

Rochester Institute of Technology
Office of Co-operative Education and Career Services
Summary
In September 1997 R.I.T. implemented the 1st Place! program, including the Web Walk-Up Module described in the University of Cincinnati College of Applied Science section above. Currently, the student section of the database has been running successfully for 1 and 1/2 years; the employer module has not yet been implemented.

Current Web Access
Since Co-op and Career Services are housed in the same department, the Web site provides overall job search and career information and is not specific to co-op. As part of the Web site, detailed campus career resources and exterior Web links are also available. Student access to the job posting system is the same for co-op and full time positions, and all access is via the Web.

Technology Plans
Current plans include implementation of the Web Walkup module for employers which when it is finished, will provide similar functionality to the University of Cincinnati College of Applied Science, described above. They also plan to expand the web site in many areas including on-line surveys, student access to databases of past co-op job, and campus interview opportunities for research purposes.

Decision-Making
Decisions regarding technology are being made internally.

Georgia Institute of Technology
Co-operative Division
Summary
As of February 1999, Georgia Tech is currently combining a variety of old and new systems to manage their co-op processes. The basis of the current system, which will be replaced, as of summer 1999, is a homemade Macintosh based system that runs on a Filemaker Pro database. This system is used to maintain scheduling information, employer records, and contact information. Job postings are maintained on a separate central mainframe and are available to students who “telnet” into the system. The positions can be quarried, searched or sorted.

Student demographic information is downloaded from the Banner 2000 information system, but the three systems do not currently communicate with each other. Therefore, updating and changes often require multiple entry.

Current Web Access
Basic information about the co-op program is available to students, and employers. This includes a directory, Co-op Student Handbook, instruction on telnetting to the jobs database, employer homepage links, downloadable copies of resume templates, and a work-term report form.

Technology Plans
Georgia Tech has just finished implementing the Banner 2000 student information system and is in the process of switching to the 1st.Place! system. This system, like RIT’s when completed, will provide the same functionality as the systems used by University of Cincinnati College of Applied Science, described above.

Decision-Making
The decision to switch to 1st.Place! was made within the Cooperative Division after it became evident that the product that was being used by the career services offices statewide did not meet their needs.

University of Victoria
Co-operative Education Programs
Summary
At the University of Victoria, a seven-year-old FoxPro database program has evolved into a tool for managing co-op information. It contains five separate modules that interact. These are contacts, students, job descriptions, placements, and history.

The program can send information to word processors (e.g. mail merge), the Web
(e.g. job postings), or an email client (e.g. student and employ communications). Users can query the database and all of the modules can generate a myriad of reports for archiving and statistical needs.

Each co-op department maintains a discrete database on its own server; there is no sharing of either student or employer information.

Job postings, which arrive by fax, mail, or the Web, are entered into the system by staff. Students access the job-posting component of the database via the Web and submit paper copies of resumes into bins, which are then sent to employers.

The University of Victoria uses a matching system, like Drexel and Waterloo. Employer and student selections during the match process are entered into the Placement Data Set portion of the database. At the end of the matching process, “Confirmation of Placement” letters are generated by the system.

Current Web Access
Employers are currently using the Web for posting general information about co-op, for student access to job postings, submission of cover letters and resumes for on-line access. Employers may submit job descriptions via a Web form that is transmitted by email to the relevant department. Students have access on the Web to job descriptions and to any forms they may need for the co-op process. A creative addition to the Web is a sophisticated interactive set of pages containing the curriculum for an “Introduction to Co-op” course.

Technology Plans
Current discussions center on sharing student demographic information across different units that currently have separate information systems. For example, separate demographic information is now maintained by the registrar, the faculty, and each co-op department, causing a great deal of confusion. One other modification under consideration is adding learning objectives to the database so that they can measure the value added by co-op.

Decision-Making
Decisions are being made by a committee of co-op representatives from different departments.

Northeastern University Department of Cooperative Education
Summary
Northeastern University spent considerable time and money on a university-wide information system in the mid 1990s. Unfortunately, when the partner company dropped the project, Northeastern was left with a legacy system that is still the backbone for co-op information. The main co-op database stores historical student co-op assignment and salary Information, as well as employer and primary contact data. Although the system allows coordinators to track students working at a particular company over time, reporting functions are minimal.

To supplement the University system, currently 87 percent of the coordinators use Paradox, 4th Dimension or Excel to maintain more detailed employer and student records. Several of these coordinators run their own sophisticated databases to track employers, job descriptions and/or student data. Currently, these are not shared and operate separately.

Most job descriptions are still paper-based and kept in binders with 12 percent of coordinators making job descriptions available on-line. One program utilizes a server to make job descriptions and student selections for resume referral available via the Web.

Current Web Access
The department has developed a Web site with general information on co-op and maintains links to specific program Web pages where applicable. Some coordinators have individual Web pages for students in selected majors. Several programs allow employers to send in job descriptions via a Web form.

Technology Plans
As of February 1999, the functional specifications for a new system have been outlined and business processes are being mapped. The division is researching options for building the system internally or hiring an outside vendor.

Although the program may be phased in over the next year, the system will include employer, student, and administrator sections and will be similar in functionality to the new systems being developed by ASI described above, except for the matching function.

Decision-Making
A committee comprised of Co-op and Administrative Computing personnel is designing the functionality of the system and will decide on a software vendor.

University of Huddersfield School of Computing & Mathematics Placement Unit
Summary
Sandwich education (co-op) programs are decentralized at most universities in the UK, where they are administered within academic units.

In the School of Computing and Mathematics at the University of Huddersfield, preparation for placement begins in a course, taught by a Faculty Tutor, that students attend weekly until they accept a placement. Faculty share open job descriptions with students in the course and some of these are emailed also.

Students use a Microsoft Word template to create their CVs and submit these with a Preference Form to the Placement Office. Currently paper versions are mailed to most employers, but some are sent as Word attachments.

Current Web Access
Beginning in September 1998, the school put three related Web information systems on-line for students on placement:

• A discussion group for various issues, where comments stay on-line for 1 week
• A Knowledgebase for technical solutions, which is maintained for the year
• A contact database, where contact, email, and employer information may be...
Technology Plans
Funded by a grant from the Higher Education Funding Council for England, the school is developing a model Sandwich Education information system called MaPPiT (Mapping the Placement Process with Information Technology). The system, which is being developed in Lotus Notes, will be made available to all schools at all Universities in the UK, when it is completed in summer 1999. Units within Universities that adapt the system will still maintain separate databases.

The project began by creating a business process model that included all operations essential to running an effective and professional placement unit. Once the model was designed, the team began to build an electronic process support system in Lotus Notes. The goal was not to “automate” the process, but to present information in a way that allows the placement unit to operate efficiently and effectively. The program will run in Lotus notes and certain aspects of it will be made available via the Web using a Domino server.

The management parts of the MaPPiT system run on an internal server, accessible by placement tutors, visiting tutors, and administrative staff. The system stores company, contact information and job descriptions as well as a detailed set of contact notes. One of the built-in features of Notes is the ability to easily update and to flag changes in information. Thus if one tutor updates a record, this change is automatically flagged for the other administrative users of the system.

Several Notes features designed to provide group and workflow support will be included which will increase the functionality of the system. For example, a “To do” action list management tool is built-in.

Sections of the database will be replicated on an external Domino server so they will be available on the Web. Company information and job descriptions will be available to students. Companies will eventually be able to update their own job descriptions on the Web using a password-protected system.

Students will upload their Curriculum Vita (CV) to the Web, browse company information and job descriptions, submit individualized cover letters and sign up to have their CVs sent to specific companies. From the management side, staff will be able to monitor the individual progress of each student toward his or her placement goal.

Decision-Making
The MaPPiT system is being developed by a team at Huddersfield University with feedback from several universities in the UK.

The University of Ulster
Faculty of Informatics

Summary
The strategy of the Faculty of Informatics, within the University of Ulster has been to use standard and available software packages to manage their co-op process and to show other units how to do the same. Company and contact information is maintained on a sharable electronic card file. As job descriptions come in, they are transmitted to other Tutors and to students using a group email system, one job description at a time. Students express their interest in applying for a position by email.

Students create their CV and a Standard Application Form using a Word template on an internal server. They are emailed to the administrator and stored on a server, and then can be transmitted to employers as email attachments, faxes or posts. More companies are opting for email versions.

Current Web Access
A basic Web page with instructions for students preparing for placement and for employers is available. Students can also indicate their preferences for employers on-line.

Because many students in the UK are on managed work placement in widely dispersed international locations for a period of 1 year, the Web site was designed to help them keep in contact with each other while on placement. Students can make their address, email and employer information available to other students if they wish.

Once students finish a placement, they submit a detailed Placement Report describing the nature of the position, skills used, and training received. These are all available to other students on-line when they are researching companies and deciding where to have their CVs referred.

APPENDIX A
World Wide Web URLs
For Co-op Programs
Drexel University
Co-op and Career Services
http://cmc.wd.drexel.edu/coop/cemp.html

Georgia Institute of Technology
Cooperative Division
http://www.coop.gatech.edu/welcome2.html
Northeastern University
Division of Cooperative Education
http://www.neu.edu/coop/default.html
Rochester Institute of Technology
Office of Co-Operative Education and Career Services
http://www.rit.edu/~964www/
University of Cincinnati
Division of Professional Practice
http://blues.fd1.uc.edu/www/propractice/
Professional Practice and Career Placement Department
College of Applied Science
http://www.ocasppcp.uc.edu/
University of Huddersfield
School of Computing and Mathematics
http://webserver.hud.ac.uk/schools/comp+maths/placements/
MaPPiT project
http://www.hud.ac.uk/schools/comp+maths/mappit/home2.htm
APPENDIX B

Providers of Information

Drexel University
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