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**ABSTRACT**  
**THE TRANSITION TO AN ELECTRONIC JOURNAL COLLECTION:  
MEASURING THE OPERATIONAL AND ECONOMIC IMPLICATIONS**

The overall objective of this study is to evaluate the economic implications of converting the entire current journal collection of a university library to an all digital format. This is an applied research project, the results of which will be useful to those who fund and manage digital library collections as well as other library staff and persons involved in training the library workforce of the future. The three key research questions are:

- What is the impact on library staffing needs?
- How have library costs been reduced, increased and/or re-allocated?
- What other library resources have been affected?

The Drexel University Hagerty Library's entire print and electronic journal collections will be the testbed used to study these questions. The Drexel Library is fast tracking what we believe to be the inevitable transition from print to electronic journals. The Library is migrating to an all electronic journal collection on a timeline far ahead of most, if not all, historically print-based university libraries. The only journals now retained in print are titles for which satisfactory electronic counterparts do not exist or which have characteristics that are not equivalent in the electronic version of the journal. A small browsing collection will also be retained. For Year 2000 renewals the Library subscribes to about 1,000 print journals and approximately 5,000 electronic subscriptions. With very few exceptions new subscriptions are entered for electronic journals only.

Baseline data, e.g., volumes and issues re-shelved, number of print subscriptions and volumes bound, are available for FY97/98, just prior to the introduction of electronic journals. Unit costs for these and similar activities related to print journals will be computed by measuring the staff time, subscription costs and other costs related to each activity. A similar approach will be taken to determine the per-journal cost of acquiring and maintaining electronic subscriptions. All library services impacted will be studied including changes in reference service, document delivery, and instructional programs. The results will not only provide valuable cost comparison data, but will provide a model for assessment that will help other library administrators plan and budget for this transition.

Drexel University, a Doctoral I science and technology university, is well positioned to accept the risk that this fast track migration entails. University and Library infrastructures are in place; Drexel is a highly technological university with a high level of computer literacy among both faculty and students; the Library has already made substantial progress in the transition; and the University administration encourages and supports technological innovation.

The requested funding will partially support the research components of the project. Drexel University covers the cost of journal subscriptions (print and electronic) and operating expenses associated with creating and maintaining the testbed.

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# NARRATIVE

## 1. Introduction

The overall objective of this study is to evaluate the operational and economic implications of converting the entire current journal collection of an academic library to an all digital format. This is an applied research project. The key research questions are:

- *What is the impact on library staffing needs?*
- *How have library costs been reduced, increased and/or re-allocated?*
- *What other library resources have been affected?*

Until very recently, a major barrier to implementing a large-scale collection of journal articles was insufficient access to up-to-date content. Electronic journals are now rapidly becoming available via the World Wide Web, the electronic delivery mechanism of choice for most academic libraries. Over the past two years, many scholarly publishers, including societies, have introduced electronic access to their entire offerings. They have also demonstrated real progress with respect to their willingness to un-bundle print and electronic journal subscription rates and to negotiate reasonable and fair licensing agreements.

Issues relating to managing the transition to electronic collections, the impact on library operations and costs, and the effect on those who will use electronic information are at least as important as the technological issues. The underlying assumption is that converting library journals to digital format will improve both service and cost effectiveness, but this is yet to be proven. Because the variables traditionally used for cost evaluation in an academic library shift so radically for the digital format, the need for an economic model that can be used to compare digital to print formats has been apparent to practicing librarians for some time [1]. Understanding the costs associated with the library model for delivering digital information has now become a requirement for library survival since in the digital world, as opposed to print, the library has many viable competitors. The results of this research will not only provide valuable cost comparison data, but will provide a model for assessment that will help others who fund and manage digital library collections as well as persons involved in training the library workforce of the future. **[Addresses National Impact Evaluation Criterion]**

The W. W. Hagerty Library's entire print and electronic journal collections will be the testbed used to study these questions. Drexel's goal is to create an electronic journal collection that is as effective for users as it can be given the constraints of current technology, content, cost, digital engineering and design know-how. The Library is fast tracking what we believe to be the inevitable transition from print to electronic journals, migrating to an all electronic journal collection on a timeline far ahead of most, if not all, historically print-based university libraries. The only journals retained in print are titles for which satisfactory electronic counterparts do not exist or that have characteristics that are not equivalent in the electronic version of the journal. A small browsing collection of print journals will also be retained. The transition is now over 80 percent complete. Year 2000 subscriptions number about 1,000 print journals and approximately 5,000 electronic journals. With very few exceptions new subscriptions are entered for electronic journals only.

Organizational readiness is an important factor in the ability of the Hagerty Library to move so rapidly to a new model. Drexel University is a technological university rated Doctoral I in the Carnegie classification with strengths in engineering, computer science, information science and technology, design arts and business. Faculty and students have demonstrated an eagerness to access journals in a digital format and feedback from the university community is overwhelmingly positive about Hagerty's current offerings of electronic journals. Drexel University's President, Provost and the Faculty Senate's Library Advisory Committee have enthusiastically endorsed this initiative.

Drexel has the network infrastructure to support delivery of electronic journals. Hagerty Library and the entire campus were upgraded to an ATM switched network in 1998. Lucent Technology's IEEE 802.11 local area wireless network is used to support wireless computing environments which allow laptop computers to connect from the library, student union, and computer center to the university's network. Drexel was the first university to require that students purchase a computer (since 1984) and consistently ranks high in Yahoo's list of most "wired" campuses in the country. In terms of bandwidth, Drexel is also part of an elite group as a participant in Internet II and an early user of vBNS. The Drexel University campus is fully wired in terms of network connectivity; server capacity is more than adequate.

## **2. Background**

A key recommendation of leading digital library researchers involved in the Joint NSF-EU Working Groups on Future Directions of Digital Libraries Research is to study the "... use of large-scale, distributed and operational digital libraries which provide real content to real users." Their report states that: "This has been shown to be a very fruitful approach in digital library work to date and the engineering and deployment should be continued" [2]. Schatz and Chen state, "It is hard to evaluate new technology in the absence of real users and large collections" [3]. To date, digital library research has focused on either specialized collections with limited user groups, e.g., University of California at Santa Barbara's Alexandria Project [4] of spatially-referenced map information, or add-ons to print libraries, e.g., the California Digital Library, the tenth library of the UC system, which has new funding and its own staff [5]. These resources are not yet all-inclusive substitutes for print collections, as will be the case for most academic libraries if electronic journal collections are to be affordable.

While to our knowledge no other U.S. academic library has yet converted most of their journal subscriptions from print to electronic format, a number of related efforts are in progress. One goal of the California Digital Library is to develop a viable financial model [5]. OhioLINK, the Ohio Library and Information Network, provides a central library catalog, and a large number of electronic research databases, including electronic journals to Ohio libraries. A cooperative venture of university libraries and the Ohio Board of Regents, OhioLINK receives direct state funding [6].

Other projects have involved creating testbeds and studying them. For example, DeLiver is an experimental search system that grew out of the University of Illinois Urbana-Champaign DLI Phase 1 Project. It contains tens of thousands of articles from 54 engineering, physics and computer science journals. Researchers at UIUC have conducted ongoing observations of engineering work and learning activities and how they intersect with the use of this distributed digital information [7].

The NSF/ARPA/NASA-sponsored University of Michigan Digital Library Project (UMDL) provides access to significant public domain and proprietary collections of scientific data and information including journal literature. The UMDL incorporates basic research, system building with an emphasis on agent-based interfaces, deployment, and evaluation of a usable digital library [8]. The PEAK project, also based at the University of Michigan and supported by the UMDL, provided access to the 1,000+ journals published by Elsevier Science. Its objective was to provide an experimental service for electronic journal delivery and pricing research [9].

The Drexel project adds to previous research in several ways. First, a wider variety and a greater amount of digital journal content will be available to a much larger group of users than in any previous study. Second, print resources are being discontinued. Third, the focus is on the impact on library operations, rather than on the economic impact for publishers or on user behavior and acceptance.

### **3. Plan of Work**

#### **3.1. Test Bed: Developing the Electronic Journal Collection**

##### **3.1.1. Journal Selection**

As with traditional print collections, the heart of the electronic journal collection is its content. Hagerty librarians began developing and refining selection methods for electronic journals in 1998. The selection/ordering process is a team effort involving professionals with subject expertise, traditional serials ordering, processing and cataloging experience, and computer and technical skills. In addition to factors used to evaluate print journal purchases (e.g., content, cost, and faculty requests), interface options, features and access restrictions factor into the selection decisions for electronic journals. Review of usage statistics is an important component in journal renewal decisions.

The Hagerty Library provides access to approximately 5,000 full-text electronic journals through agreements with over 39 content providers. See the list of vendors and services in **Attachment A**. Agreements are being actively sought with all additional vendors who have relevant full-text material falling within the scope of the journal collection policy. During 1998 and 1999 Drexel participated in the Elsevier/University of Michigan's PEAK experiment (see background section) and recently finalized arrangements to access all of the 1,050 full-text journals in Elsevier's ScienceDirect product. The Library plans to provide electronic access (including remote access) to all of the journal articles needed by its users as quickly as possible, **and to cancel** the corresponding print publications.

##### **3.1.2. User Interface**

Interface design is a critical issue in delivery of digital information. That the interface will be web-based is a given. However, web interfaces vary greatly. The Library currently displays electronic journals in static lists (alphabetically by title and by subject areas) which are generated daily from a central database on a Sun/Solaris server using MySQL. The public interface to this database is currently being developed by Library staff and will allow dynamic searching of the journals from the web site. Whenever possible, direct links to the journal titles are provided. See <http://www.library.drexel.edu/er/er.html> for the current web interface. The Library is currently in the process of implementing Innovative's Millennium library automation software using Oracle as the database platform (the first library to purchase this product). As soon as the core catalog is loaded in the Spring of 2000, we will begin to catalog electronic journals. Two other interface-related technologies that affect the delivery of electronic journal information – authentication and printing mechanisms – are also in the process of being upgraded.

#### **3.2. Research Methods and Objectives**

In the transition from print to electronic journals, the three research questions we address are:

- *What is the impact on library staffing needs?*
- *How have library costs been reduced, increased and/or re-allocated?*
- *What other library resources have been affected?*

##### **3.2.1. Research Objective 1: What is the impact on library staffing needs?**

These questions are inter-related, and since staffing is both the largest cost and the area of greatest expected change, staffing will be addressed first. Staffing pattern changes will be measured and evaluated following the “guided introspection” method utilized by Abels, Kantor and Saracevic to account for the labor costs related to library services [10]. Information will be gathered using this self-reporting technique for library personnel

whose work responsibilities have been directly affected by the transition to electronic journals. The technique involves interviewing staff using a predetermined list of activities to estimate amount of time (percentage, hours per week) spent on each activity.

In order to identify staff whose work is related in any way to print or electronic journals, Library supervisors will conduct formal job task analyses utilizing the Task Inventory Approach (TIA), a method widely used in the military. The TIA consists of creating checklists of tasks that personnel in a given job function might perform. Subject matter experts (in this case, departmental supervisors and managers) develop the checklists. Then individuals who perform the functions identify the tasks they perform and the amount of time spent on each [11]. The task inventories are directly related to the routine operational review process (for annual performance reviews and job description revisions). The compilation and analysis of the results will provide the task lists for the guided introspection interviews.

Our hypothesis is that certain staff functions will decrease (e.g., serials check-in, bindery, shelving) while others will increase (e.g., vendor negotiations, collection management, particularly product evaluation, training and user support, and web maintenance). Initial impressions indicate that the number of clerical positions in a typical academic library will decrease, while the number of professionals, particularly those with good problem-solving skills, will increase. The extent of this expected shift is unclear. The information learned in this part of the project will yield important objective data needed for informing management decisions in academic libraries. For example, in anticipation of a lower need for clerical staff, Hagerty now hires students for non-professional positions because they can be expected to leave voluntarily when they graduate, thus increasing flexibility in staffing and minimizing the need to eliminate positions and lay staff off.

**Table 1** shows the staff activities so far identified that we anticipate will be impacted. It is obvious that no area of the library will be left untouched.

Time devoted to an activity per unit will be calculated based on the activity volume at the time of measurement. For example, assume that the staff was shelving an average of one journal volume every minute, and the daily volume of shelving was reduced from 300 volumes per day prior to the introduction of electronic journals to 200 volumes per day after providing half the journal collection electronically. Then, the amount of time devoted to shelving would be reduced from 5 hours to 3.3 hours, and projections can be made regarding the effect of a 90-percent electronic journal collection.

**Table 1: Library Activities Impacted by the Transition to Electronic Journals**

<b>Department</b>	<b>Activity</b>	<b>Impact</b>
Circulation	Re-shelving	Reduced staffing needs
	Stack maintenance	Reduced staffing needs
	User photocopying	Reduced use & revenue
	Collecting use data	Reduced staffing needs
Reserve	Article file maintenance	Reduced staffing needs
	Article checkout	Reduced staffing needs
Technical Services	Print journal check-in	Reduced staffing needs
	E-journal acquisitions	Increased staffing needs
	Claiming	Reduced staffing needs
	Binding	Reduced staffing needs
	Binding	Reduced bindery costs
	Cataloging print	Reduced staffing needs
	Cataloging print	Reduced OCLC charges
	Cataloging e-journals	Increased staffing needs
	Cataloging e-journals	Increased OCLC charges
Catalog maintenance	Increased staffing needs	
Information Services	Reference desk	Increased staffing needs
	Instruction/Promotion	Increased staffing needs
	Preparing documentation	Increased staffing needs
	Journal selection	Increased staffing needs
Document Delivery	Faculty copy service	Increased staffing needs
	Interlibrary loan - Borrowing	Reduced staffing needs
	Interlibrary loan - Borrowing	Reduced vendor charges
Systems	Infrastructure purchase	Increased equipment costs
	Infrastructure maintenance	Increased staffing needs
	Infrastructure maintenance	Increased contract costs
	Negotiating contracts	Increased staffing needs
	Setting up access	Increased staffing needs
	Developing decision support tools	Increased staffing needs
	Collecting use data	Increased staffing needs
	Printing	Increased costs & revenue
Administration	Managing the change	Increased staffing needs
	Attention to decisions	Increased staffing needs
	Budgeting	Increased staffing needs

**3.2.1. Research Objective 2: How have library costs been reduced, increased and/or re-allocated?**

Staff time per activity along with an average or median salary will be used to compute the staff cost per activity at the time the measurements are taken. This cost divided by the volume of the activity will give the staff cost per unit. Other operational costs, if any, will then be added to staff costs to estimate the unit cost of the activity. For example, binding costs will be added to the unit staff cost to project a total for volumes bound.

Baseline data on, for example, volumes and issues re-shelved, number of print subscriptions and volumes bound, are available for FY97/98, just prior to the introduction of electronic journals, and annually since then. Table 2 shows the type of statistical data that is collected routinely by Library staff.



**Table 2. Sample Library Statistics**

DESCRIPTION
<ul style="list-style-type: none"><li>▪ Re-shelving statistics for print journal usage</li><li>▪ Interlibrary Loan statistics for print and electronic journal article requests</li><li>▪ Computer transaction logs of electronic journal usage</li><li>▪ Information regarding fixed and variable costs for converting to electronic journals</li></ul>

The first task, to evaluate the baseline data collected now by the Hagerty Library staff, is currently underway. If techniques needed to enrich the baseline data can be integrated into the Library's existing procedures, this will be undertaken and implemented immediately. During the project further actions may be taken to enrich the information available for analysis.

Defining the appropriate metrics for measuring digital libraries is an interesting and challenging problem in and of itself. The electronic use data we plan to capture and analyze will require considerable thought and some programming. But this will be necessary to compare the cost per use of an electronic journal as opposed to the cost per use of a print journal.

Another obvious difference between print and digital formats has to do with the nature of other [i.e. non-staff] library resources needed to provide them. In the case of print journals, a large fixed cost is the physical facility; operating expenses include items like subscription costs, bindery and labor. For electronic journals, the fixed costs include startup expenses for the network infrastructure, hardware, software, and web site design; operating expenses still include subscriptions and labor and (we believe) a higher demand for support functions, e.g., reference and training. It is clear that the costs shift. Our goal is to describe those shifts and to discover whether the overall costs have increased, decreased or simply been reallocated.

The cost evaluation will compare and analyze changes over time from 1998 through 2001. We propose to use a functional cost analysis method patterned after Abels, Kantor and Saracevic [10], and similar to that used in the landmark ARL/RLG Interlibrary Loan Cost Study [12,13] to evaluate the economic effects of converting to a digital journal collection. This method involves analyzing the specific resource requirements (including fixed or capital costs and operating expenses) of representative transactions and activities. (See **Table 3** for possible data elements relating to cost.) The study of staffing patterns described in **Objective 1** will provide a critical piece of the cost study.

Standard accounting practices combined with statistical analysis will be used to derive (1) the average cost of making a print journal article available, and (2) the average cost of making an electronic journal article available. The cost breakdowns will show which are fixed costs and which are variable costs (such as subscriptions) that adjust quickly. The number of the library's print articles viewed will be estimated using re-shelving statistics, and the number of electronic journals viewed will be calculated from web statistics.

While this process sounds straightforward, it is not. When such unit costs have been measured in libraries there has been great variation both within a library and among libraries. Abels et al. [10] discuss this variation and also describe the difficulties and constraints on such studies. In particular, dividing certain costs (e.g., public workstations, staff overhead activities such as reading email and attending meetings, administrators' salaries) among services is far from simple or precise. So, while results are not guaranteed to be typical, they will have value as a starting point, and the project will provide methods and instruments that can be used elsewhere to compute these costs for other libraries.

The potential data elements relating to the cost of making journals available both in print and electronic formats are outlined in **Table 3**. Fixed costs are relatively easy to identify although deciding how to allocate them is complex. Some variable costs are more difficult to measure and involve repeated observations over time in order to obtain a valid unit cost. For example, the cost excluding overhead of shelving a print journal can be calculated by dividing the total journals shelved by the cost of the employees' time to carry out this task. As the use of the print collection declines over time, the unit cost of shelving might increase serving as an indicator that staffing allocations must be reviewed.

**Table 3. Data Elements Relating to Journal Availability Costs**

FORMAT	POTENTIAL DATA ELEMENTS	
<b>PRINT JOURNALS</b>	<p><i>Fixed costs:</i></p> <ul style="list-style-type: none"> <li>▪ Space and facilities allocation</li> <li>▪ Administrative expense allocation</li> <li>▪ Equipment</li> <li>▪ Hardware and software (library system)</li> </ul>	<p><i>Variable costs:</i></p> <ul style="list-style-type: none"> <li>▪ Journal subscription price</li> <li>▪ Ordering subscriptions</li> <li>▪ Checking in a journal issue</li> <li>▪ Shelving a journal</li> <li>▪ Sending a journal to the bindery</li> <li>▪ Claiming a missing issue</li> <li>▪ Processing an Interlibrary Loan request</li> <li>▪ Assisting user with locating material</li> <li>▪ Identifying or verifying a citation</li> </ul>
<b>ELECTRONIC JOURNALS</b>	<p><i>Fixed costs:</i></p> <ul style="list-style-type: none"> <li>▪ Space and facilities allocation</li> <li>▪ Administrative expense allocation</li> <li>▪ Network infrastructure</li> <li>▪ Hardware and software (library system)</li> <li>▪ Other server hardware and software</li> <li>▪ Web site design</li> </ul>	<p><i>Variable costs:</i></p> <ul style="list-style-type: none"> <li>▪ Subscriptions and access fees</li> <li>▪ Negotiating a specific license/arranging for access</li> <li>▪ Web site maintenance: <ul style="list-style-type: none"> <li>▪ Adding a journal to the web database</li> <li>▪ Updating design and software</li> <li>▪ Running reports</li> <li>▪ Checking and repairing broken links</li> </ul> </li> <li>▪ Assisting user with locating material</li> <li>▪ Providing computer assistance and training</li> <li>▪ Technical troubleshooting (access difficulties)</li> </ul>

After all the costs are identified, we will compute unit costs: (1) making a journal title available, and (2) cost per journal article use that could be used by others. It will be interesting to see how these two costs vary between the two formats. The unit cost approach will yield both a number and a process for computing cost that could be used by other libraries or in other research studies.

### **3.2.1. Research Objective 3: What other library resources have been affected?**

This part of the research is less rigorous and more exploratory than the first two studies. In part, it is a search for unintended consequences. We will examine the space implications of electronic collections, especially in regard to duplicating online subscriptions in print. Other non-staff, non-immediate cost impacts are not apparent but, if they exist, should become clear as the intensive work on staffing patterns and known costs is carried out.

### 3.2.2. Analysis of the Results

Of necessity the research will take place in an operational environment. This approach has both positive and negative aspects. It does not have the "artificiality" of an isolated experiment; however, it lacks strong control over variables as in a laboratory environment. For example, costs of necessity must be estimates. They will vary with the speed and skill of individuals and their salaries. Salary and skill do not always correlate; it is possible, for example to have a quick, bright but low-paid student who shelves more quickly than permanent clerical staff.

Another challenge will be interpreting the statistics. Some of the statistics that Library staff currently collects are shown in **Attachment D**. Hagerty Library statistics such as gate count are influenced by many factors including services offered, size of the student body (which at Drexel has been growing), and study comfort (influenced by a recent physical re-organization). In regard to electronic journals, the gate count might be reduced because the journals are available online, more students may be coming into the Library to use our computers to access the online journals. In another example, our statistics show book use as indicated by both re-shelving and circulation falling by 25% at a time when the book collection has been improved (we think) by an infusion of additional funding and more rigorous selection practices. Does this mean that students and faculty are using web information as a substitute for information previously found in books? A major contribution of this project will be to provide the framework including questions that other librarians should ask as they embark on the development of electronic collections. [**Addresses National Impact Evaluation Criterion**]

**Attachment D** also contains sample reports with statistics available now to evaluate electronic resources. These statistics require considerable re-working to obtain a useful picture. Part of the Webmaster's time on this project will be programming to obtain more specific data and to organize it. At present maintaining the spreadsheet in **Attachment D** is very labor-intensive.

### 3.3. Management Plan [Evaluation Criterion]

Dr. Carol Montgomery, as Principal Investigator, will have overall responsibility for the proposed project. She is also the Dean of Libraries at Drexel University and so has administrative authority over all aspects of the Library including the staffing, collection development, policies and procedures critical to the proposed research. On an operational basis, she and Ms. JoAnne Sparks, the Associate Dean, share the administrative functions and will do the same for this project.

Dr. Montgomery, Ms. Sparks and the Project Researcher will form the core project team, meeting at least monthly. An advisory group for the project will be constituted to provide a mechanism for feedback to the researchers. Members will be drawn from the Library's Advisory Committee,\* the Library's professional staff and support staff who are also IST students. A half-time Project Researcher will be hired to manage the project on a day-to-day basis; collecting data and supervising other data collection, compilation and analysis; scheduling meetings, writing reports, and maintaining the project web site. The Project Researcher will be assisted by a Research Assistant who will be a student in Drexel's College of Information Studies. The Library Webmaster, Paul Corr, will assist with the creation and maintenance of the project's web site as well as provide computing support for collection of electronic journal use data.

At the start of the project the core project team will develop a more detailed schedule than appears in this proposal. This detailed timeline will indicate deliverables and responsibilities in addition to activities. The

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\* The Library Advisory Committee, a subcommittee under the Drexel University Faculty Senate, meets monthly to advise and provide feedback to the Dean of Libraries.

formative evaluation of the project will include regularly evaluating progress to see that the interim goals are met and the deliverables produced; the formative evaluation may lead to improvements in the research techniques utilized at various times. [**Addresses "Evaluation" Evaluation Criterion**]

#### **4. Qualifications of the Personnel [Evaluation Criterion]**

Dr. Carol Montgomery, the Principal Investigator, has been active in the information field for over 25 years as an administrator, teacher, researcher and author. She holds a bachelor's degree in chemistry from Bryn Mawr College and a doctorate in information systems from the College of Information Science and Technology, Drexel University. A regular contributor to the professional literature, she is the co-author of several books and has held local and national positions in numerous professional organizations. Her dissertation research resulted in a seminal, award-winning paper on the behavior of users searching online systems, which is highly cited in the literature.

JoAnne Sparks, Senior Associate, is Associate Dean for Resource Management at the Hagerty Library and Adjunct Faculty in the College of Information Science and Technology (IST) at Drexel University. In addition to practicing librarianship for over 17 years, she teaches a variety of courses in IST. The results of her first research project were recently published, a study of public health students' critical evaluation skills with information on the Internet using a content analysis technique. Her applied experience will be invaluable. Ms. Sparks is presently enrolled in the IST doctoral program.

The Library Webmaster, Paul Corr, is also a student in IST. He has over 6 years experience as a webmaster and is trained and experienced in database development, web server administration, PERL, JavaScript as well as HTML coding.

See **Attachment B** for Resumes of Dr. Montgomery, Ms. Sparks, and Mr. Corr.

#### **5. Future Directions**

An underlying, but untested, assumption of this project is that electronic journals will be more cost effective than print journals. This research will help answer that question. Once the all electronic journal collection is created, it will remain in place as a major component of the Hagerty Library collections.

More studies are possible with the data collected during the course of the proposed research than will be feasible to analyze with the resources available for this project. These data will be made available to faculty and students in Drexel's College of Information Science and Technology for further analyses. Doctoral students will be encouraged to build their dissertation research on this project. Data will also be available for other graduate students to use for independent study projects or class assignments. Other possible researchable questions include: Does linkage to the full text from a database increase use of a title? Does use of electronic journals show the usual Bradford distribution? In a particular field, is electronic journal use heaviest in journals previously owned in print? How does electronic journal use compare to Institute for Scientific Information (ISI) data on journals cited by Drexel faculty? [**Addresses Sustainability Evaluation Criterion**]

#### **6. Promotion and Dissemination of the Results**

We plan to present papers at key conferences and to publish at least two articles describing the interim results of the project as well as disseminating the final (summative) evaluation. In addition to the research related publications and papers, Hagerty Library faculty and staff plan to present and write articles relating to the operational issues that are not part of the direct funding for this project. See **Attachment C** for abstracts submitted to the conference on the "Economics and Use of Digital Library Collections," March 23-24, 2000 in

Ann Arbor, Michigan. Finally, we will publish evaluation methods and instruments for libraries based on both the research component and on Hagerty's "experience" of developing and maintaining a digital journal collection. We plan to seek additional funding to repeat the experiment at MCP Hahnemann University, a health sciences university in Philadelphia managed by Drexel. **[Addresses Adaptability Evaluation Criterion]**

A project web site will also be created and maintained. Contents will include: the text of this proposal, progress reports, a comprehensive bibliography relevant to the research techniques employed in this study, links to conferences where we plan to present results, links to the investigators' home pages, evaluation instruments created and used for the project, articles and meeting presentations. By invitation of the editor, we are also preparing a paper on our electronic journal transition for the journal, *Serials Review*. **[Addresses Dissemination Evaluation Criterion]**

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## IMLS Project Staff

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### **Principal Investigator**

[Carol Hansen Montgomery, Ph.D.](#)

Dean of Libraries

215-895-2750

[montgoch@drexel.edu](mailto:montgoch@drexel.edu)

### **Senior Researcher**

Vacant

### **Research Assistant**

Elizabeth McCalmont

215-895-6846

[emm32@drexel.edu](mailto:emm32@drexel.edu)

### **Consultant**

[Bruce Kingma, Ph.D.](#)

Syracuse University

Carol H. Montgomery, Ph.D., Content Editor

[montgoch@drexel.edu](mailto:montgoch@drexel.edu)

**Content Editor:** [Carol H. Montgomery, Ph.D., montgoch@drexel.edu](#)



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**Carol Hansen Montgomery, Ph.D.**  
Dean of Libraries Emeritus  
Research Professor, College of Information Science and  
Technology  
Drexel University (2005 - )

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## Previous Positions (most recent)

- 1998-2005 Dean of Libraries; Professor of Information Science and Technology, Drexel University
- 1994-97 Associate Provost, Academic Informatics; Director, Institute for Academic Informatics; Director, Division of Medical Informatics, and Professor, Department of Community and Preventive Medicine, Allegheny University of the Health Sciences (formerly Medical College of Pennsylvania and Hahnemann University)
- 1985-94 Director of the Library, Hahnemann University
- 1982-94 Adjunct Professor, College of Information Studies, Drexel University
- 1980-85 Director of Library Services, Philadelphia College of Pharmacy and Science
- 1979-80 Assistant Professor, College of Library Science, University of Kentucky

## Education

1976-79 Ph.D. (Major: Information Systems;  
Minor: Information Communications;  
Subject Minor: History and Sociology of Medicine)  
School of Library and Information Science  
Drexel University, Philadelphia, PA

1966-69 M.S. in Information Science  
Graduate School of Library Science  
Drexel University

1953-57 B.A. (Major: Chemistry)  
Bryn Mawr College, Bryn Mawr, PA

## Publications

### Books

*The Microcomputer User's Guide to Information Online*. Hasbrouck Heights, NJ: Hayden Book Company, Inc. 1984.

Morantz, Regina M., Cynthia S. Pomerleau and Carol Hansen Montgomery, Editors. *In Her Own Words: Women Physicians Talk About Their Lives*. Westport, CT: Greenwood Press, 1982. Paperback edition: Yale University Press, 1985.

Issue Editor. "Pharmaceutical Information." *Drexel Library Quarterly* 18:2 (Spring 1982).

Montgomery, Carol Hansen and Thomas H. Hogan. *Online Searching: A Primer*. Medford, NJ: Learned Information, 2nd ed, 1984.

Chaff, Sandra L., Ruth Haimbach, Carol Hansen Montgomery and Nina B. Woodside, Editors. *Women in Medicine: A Bibliography of the Literature on Women Physicians*. Metuchen, NJ: Scarecrow Press, 1977.

### Articles (selected recent)

Invited Paper. "The Evolving Electronic Journal Collection at Drexel University." *Science and Technology Libraries* 24; 1/2, 173-86, 2004.

King, Donald W., Carol Tenopir, Carol Hansen Montgomery and Sarah E. Aerni. "Patterns of Journal Use by Faculty at Three Diverse Universities." *D-Lib Magazine*, 9:10, October 2003. <http://www.dlib.org/dlib/october03/king/10king.html>

Boyce, Peter, Donald W. King, Carol Hansen Montgomery, and Carol Tenopir. 2003. "How Electronic Journals Are Changing Patterns of Use." *The Serials Librarian* 46; 1/2, 121-41, 2004.

Montgomery, Carol Hansen and Donald W. King. "An "All" Electronic Journal Collection in a University Library: Two Years Later." In *Learning to Make a Difference: Proceedings of the 11th National Conference of the Association of College and Research Libraries*, April 10-13, 2003. Charlotte, NC, pp. 116-20.



King, Donald W., Peter B. Boyce, Carol Hansen Montgomery and Carol Tenopir. "Library Economics Metrics: Examples of the Comparison of Print & Electronic Journal Collections." *Library Trends*, 51:3, 376-400, Winter 2003.

King, Donald W. and Carol Hansen Montgomery. "After Migration to an Electronic Journal Collection: Impact on Faculty and Doctoral Students." *D-Lib Magazine*, 8:12, December 2002. <http://www.dlib.org/dlib/december02/king/12king.html>

Montgomery, Carol Hansen and Donald W. King. "Comparing Library and User Related Costs of Print and Electronic Journal Collections: A First Step Towards a Comprehensive Analysis." *D-Lib Magazine*, October 2002. <http://www.dlib.org/dlib/october02/montgomery/10montgomery.html>.

"Developing a Methodology for Assessing the Operational Impact of Electronic Journals." In: Knowledge Innovations: Celebrating Our Heritage, Designing Our Future: Proceedings of the 64th Annual Meeting of the American Society for Information Science. November 4-8, 2001. Medford, NJ: Information Today, Inc., 2001, 667-8.

Montgomery, Carol Hansen and Linda Marion. "Print to Electronic: Measuring the Operational and Economic Implications of an Electronic Journal Collection," in Huber, A., Linde, P. and Smith, J.W. T. eds. *Electronic Publishing 01: 2001 in the Digital Publishing Odyssey*. Proceedings of the ICCC/IFIP Conference, University of Kent at Canterbury, UK, July 5-7, 2001. Amsterdam IOS Press, 97-107.

Mancall, Jacqueline C. and Carol Hansen Montgomery. "Millenium Project Research Agenda: Collection Development." *Library Quarterly* 70:4 (October 2000), xiii-xv.

"Measuring the Impact of an Electronic Journal Collection on Library Costs: A Framework and Preliminary Observations." *D-Lib Magazine* 6:10, October 2000.

"Fast Track Transition to an Electronic Journal Collection: A Case Study." *New Library World* 101: 1159, 2000.

Montgomery, Carol Hansen and JoAnne L. Sparks. "The Transition to an Electronic Journal Collection: Managing the Organizational Changes." *Serials Review* 26:3, October, 2000.

"The Economic Impact of an Electronic Journal Collection in an Academic Library." in Borbina, J. and T. Baker, eds. *Research and Advanced Technology for Digital Libraries, Fourth European Conference, ECDL 2000, Lisbon, Portugal September 18-20, 2000 Proceedings*. Lecture Notes in Computer Science Vol. 1923. Heidelberg, CE, Bertelsmann Springer, 413-7.

Montgomery, Carol Hansen and Katherine Sherif. "The Information Problem in Women's Health: A Piece of the Solution." *Journal of Women's Health and Gender Based Medicine*. 9:5 (June 2000) 529-36.

## Reports

Strain, Paula M., Carol Hansen Montgomery and Eva C. Metzger. *The National Technical Information Service-Institute for Scientific and Technical Information of China Exchange of Information Specialists*. July 1983. McLean, VA: MITRE Corporation, October 1983, No. MP-83W13.

Montgomery, Carol Hansen and Stephen P. Harter. *Survey of Online Searching Instruction in Schools of Library and Information Science*. Dublin, OH: OCLC Development Division, October 23, 1981. No. OCLC/DD/RR-81/3.

## Theses

"Online Information Retrieval: Identification of Measures that Discriminate Among Users with Different Levels and Types of Experience." Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, July, 1979.

"Citation Patterns in Information Science." Submitted in partial fulfillment of the requirements for the degree of Master of Science in Information Science, Drexel University, June, 1969.

## Technical Presentations (selected recent)

E-Journals Only at Drexel: After Four Years. Texas Library Association 2005 Annual Conference at the Austin Convention Center , Austin , TX from April 5-8, 2005 .

Do Electronic Journals Cost Less than Print? The Librarian's Perspective. Society Publishing Strategically Facing the Future. Executive Seminar. Blackwell Publishing, National Press Club, Washington , DC , December 3, 2004 .

E-Journals Only at Drexel: After Four Years. XXIV Annual Charleston Conference: Issues in Book and Serial Acquisition at the Francis Marion Hotel in Charleston , SC from November 6, 2004 .

With Michael Mabe and Carol Tenopir. The Journals Revolution: A Primer Workshop. Libraries and Other Intermediaries. The XXIV Annual Charleston Conference: Issues in Book and Serial Acquisition at the Francis Marion Hotel in Charleston , SC from November 3-6, 2004 .

Keynote Speaker. The Serials Ecosystem: Perspectives on the Transition from Print to Electronic Journals at the University of New Brunswick, Fredericton, New Brunswick, Canada from September 25-26, 2004

With Donald W. King. "Comparison of the Cost and Use of University Electronic and Print Journal Collections." EDUCAUSE 2003: Balancing Opportunities, Expectations, and Resources Conference at the Anaheim Convention Center in Anaheim, CA, November 4-7, 2003.

With Donald W. King. "Migrating to an 'All' Electronic Journal Collection: Impact on Library Operations and Users" at "Collaborations, Partnerships and Solutions: The Quintessential Conference," a joint meeting of the Mid-Atlantic, New York-New Jersey, Philadelphia Regional, and Pittsburgh Regional Chapters of the Medical Library Association and the Philadelphia Chapter of the Special Libraries Association, at the Sheraton-Society Hill, Philadelphia, PA, October 26-28, 2003.

With Peter Boyce, Donald W. King, and Carol Tenopir. "How are Electronic Journals Changing Patterns of Journal Use?" NASIG 2003: Serials in the Park. The 18th Annual North American Serials Interest Group Conference at Portland State University, Portland, OR, June 26-29, 2003.

'Measuring the Cost of Migrating to an "All" Electronic Journal Collection: A First Step.' Mississippi State University Seminar: "Working Together to Solve the E-Journal Puzzle," Mississippi State, MS, April 25, 2003.

'An "All" Electronic Journal Collection in a University Library: Two Years Later.' ACRL 11th National Conference: Learning to Make a Difference, Charlotte, NC, April 10-13, 2003.

"Comparing Library and User Related Costs of Print and Electronic Journals: A First Step." Speaker. PALCI Fall Membership Meeting, University of Pittsburgh, PA, November 7-8, 2002.

"An Electronic Journal Impact Study: The Factors that Change When an Academic Library Migrates

from Print." 2002 LITA National Forum, Houston, TX, October 11-13, 2002.

"Assessing the Costs of Electronic and Print Journal Collections." Guest Lecturer. Ticer International Summer School on the Digital Library 2002: Course 3: Electronic Publishing, Florence, Italy, September 29 to October 3, 2002.

"An Electronic Journal Study: Factors that Change When a Library Migrates from Print to Electronic." 23rd Annual Conference of the International Association of Technological University Libraries (IATUL), Kansas City, MO, June 2, 2002.

"AN IMLS National Leadership Research and Demonstration Grant in an Academic Library." Academic Library Advancement and Development Network (ALADN), March 18, 2002, San Antonio, TX.

"Print to Electronic at Drexel: Implications of an "All" Electronic Journal Collection." HELIN Consortium Annual Meeting, Providence, RI, January 10, 2002.

"Print to Electronic: Measuring the Operational & Economic Implications of an Electronic Journal Collection." Library Research Seminar II, November 2, 2001, CollegePark, MD.

"Print to Electronic: Measuring the Operational and Economic Implications of an Electronic Journal Collection." Poster Session. ACM/IEEE Joint Conference on Digital Libraries, Roanoke, VA, June 25, 2001.

"Finding and Evaluating Health Information on the Internet." Canyon Ranch, Tucson, AZ, June 12, 2001.

"Managing the Transition to an Electronic Journal Collection." PaLA Annual Conference, Lancaster, PA, September 24-27, 2000.

With JoAnne L. Sparks, "Framework for Assessing the Impact of an Electronic Journal Collection on Library Costs and Staffing Patterns" [PDF]. Economics and Usage of Digital Library Collections, Ann Arbor, MI, March 24, 2000. March 2000. (27 April 2000).

With Katherine Sherif. "The Information Problem in Women's Health: A Piece of the Solution." Fifth Annual Congress on Women's Health Research, Washington, DC, June 19, 1997; AUHS Clinical Research Conference, Philadelphia, PA, June 12, 1997.

"Status of SLIP and PPP Connections in Academic Health U.S. and Canadian Health Sciences Universities." Health Sciences Libraries Consortium Symposium, Philadelphia, PA, April 24, 1997.

Medical Informatics. Executive Leadership in Academic Medicine (ELAM), Bryn Mawr, PA, September 27, 1996.

## **Professional Associations**

American Library Association  
American Society for Information Science  
Association for Library and Information Science Education  
Beta Phi Mu, Honorary Library Society

## **Professional Activities (selected)**

Elsevier Science, North American Library Advisory Board (2002-05)

Institute for Museum and Library Sciences (IMLS)  
National Leadership Grants Field Reviewer for Research and Demonstration Category (2001-03)

PALINET  
Board of Trustees (1998-2001)

OCLC, Inc.  
User's Council Delegate (1992-95)  
User's Council Alternate Delegate (1981-84)

AIDS Library of Philadelphia, Advisory Committee (1991-95)

American College of Physicians, Core Committee to review "A Library for Internists"  
(1990-91, 1993-94)

National Library of Medicine  
Index Catalog Project, QA Committee (2000-02)  
Site Visit Team for IAIMS Applications (1990-91), (1993-97)  
Biomedical Library Review Committee (1989-93)  
Chair, Medical Library Resource Subcommittee (1990-93)

Association of Academic Health Sciences Libraries Directors  
Information Management Technology Committee, Chair (1993-94)  
Program Committee Chair, (1989-90)

Medical Library Association  
Joseph Leiter NLM/MLA Lectureship Committee (1993-96)  
Research Task Force (1992-94)  
Library Research Section, Chair (1988-89)  
*Bulletin* Consulting Editor's Panel (1985-88)  
Pharmacy and Drug Information Section, Chair (1983-84)  
Oral History Committee, Chair (1979-80)  
Philadelphia Chapter, Chair (1976-77)

American Society for Information Science  
SIG/MED Secretary/Treasurer (1993-95)  
Special Interest Group, International Information Issues, Chair (1985-86)  
1984 Convention Program Committee (1983-84)  
Best *Journal of the American Society for Information Science* Paper Jury  
(1980 and 1982)  
Conferences and Meetings Committee (1981-83)  
Delaware Valley Chapter, Chair (1974-75)

Drexel University, College of Information Studies  
Research Advisory Committee (1989-92)  
Search Committee for Dean (1986-87)  
Self-Study Advisory Committee (1974-75)

10th National Colloquium on Information Retrieval, Chair (1973)

## Honors and Awards

First Robert Preston Lee Award of the Philadelphia Regional Chapter/MLA (recognizes an outstanding contribution in information technology), 1992.

Runner-up, Best Paper Award. *Journal of the American Society for Information Science*, 1982.

Thesis selected for the Doctoral Forum, 43rd Annual Meeting of the American Society for Information Science, Anaheim, CA, October 6, 1980.

Runner-up, Best Paper Award. The National Online Information Meeting, New York, NY, March, 1980.

American Society for Information Science Chapter of the Year Award (for the year I was Chair, 1975).

Elaine D. Kaskela Award for the Best ASIS Chapter or Special Interest Group Newsletter (Co-editor, 1974).

Beta Phi Mu, Honorary Library Society (1969).

Contact: [montgoch@drexel.edu](mailto:montgoch@drexel.edu)

Last Updated: 18-May-2005

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**Content Editor: [Carol H. Montgomery, montgoch@drexel.edu](#)**

Modified: 01-Jul-2005

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## Interim Narrative Progress Report (First)

### The Transition to an Electronic Journal Collection: Measuring the Operational and Economic Implications

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In this report we review the status of project goals and objectives after six months (October 1, 2000 - April 1, 2001). Project staff met overall goals for the first phase of the project. The Senior Researcher joined the project staff on December 1, 2000, which caused a two-month delay to the start of the project. The Research Assistant began work on January 2, 2001. Below are specific goals for the project and their status:

#### **A. Project web site**

The web pages are located on the Hagerty Library website at: <http://www.library.drexel.edu/about//imls/imls.html>.

Currently, the site includes pages for:



- a. Project Overview
- b. Grant Proposal
- c. Project staff.

The following pages will be added shortly:

- a. Bibliography
- b. Progress Report
- c. Evaluation Plan
- d. Activity Logs
- e. Data Dictionary

### **B. Time / motion study of journal related staff activities**

A considerable amount of time during January was spent in meeting with staff, individually and in groups, in order to develop lists of specific activities related to print and electronic journals. We drafted staff Activity Logs and conducted trial data collection periods. The categories of activities and their definitions are contained in the Data Dictionary (available shortly on the project web site). Data collection officially began in mid-February 2001 and continued for two months. Each staff member completed an Activity Log, which recorded the number of minutes spent on a particular activity daily. Journal related activities in Hagerty Library follow a cyclical pattern, depending on renewal times and the academic calendar. In order to capture the most accurate picture of staff activity, sampling will continue throughout the year. Staff will record their time on journal related activities during the first week of every month. Thus, we expect that this initial data collection period will show the smallest amount of journal related activity occurring during the year and will serve as a baseline or "steady state".

### **C. Analysis of capital and operating costs**

The data on capital and operating costs is being collected and preliminary analysis is beginning. We expect to spend a major portion of the next several months refining these numbers.

### **D. Dissemination of information about the project**

We submitted proposals for presentations to eight conferences. The conferences represent audiences from a wide range of professional groups: librarians, library

administrators, and researchers. The conferences are listed below along with the status of the proposal.

**1. Association of College and Research Libraries/Delaware Valley Chapter (ACRL/DVC) 50<sup>th</sup> Anniversary Conference** October 13-14, 2001, "ACRL, Delaware Valley Chapter@50: Fifty Years of Leadership and Service to Academic Libraries", Philadelphia. <http://www.acrldvc.org/>. Paper proposal submitted.

**2. American Library Association (ALA) Annual Conference** - Poster proposal rejected.

**3. American Association for Information Science and Technology (ASIST) 2001 Annual Meeting**, November 5-8, Washington, DC. <http://www.asis.org/>. Poster proposal accepted.

**4. The First ACM and IEEE Joint Conference on Digital Libraries (JCDL 2001)** June 24-28, 2001 Roanoke, VA. <http://www.jcdl.org/>. Poster proposal accepted. Linda Marion will present.

**5. International Council for Computer Communication and International Federation for Information Processing (ICCC/IFIP) Conference ELPUB2001 '2001 in the Digital Publishing Odyssey'**. Canterbury, UK July 5-7, 2001. Paper proposal accepted. Dr. Montgomery will present. <http://library.kent.ac.uk/iccc/2001/main.html>

**6. Library Research Seminar II (LRS II)** University of Maryland November 2-3, 2001. <http://www.dpo.uab.edu/~folive/LRSII/>. Paper proposal accepted.

**7. North American Serials Interest Group (NASIG) 16th Annual Conference** May 23-26, 2001. Trinity University, San Antonio, Texas. NASIG 2001: A Serials Odyssey. <http://nasig.org/public/conferences.html>. Poster proposal accepted. Hagerty Library Serials Librarian, Mary Alice Robinson, will present.

**8. Drexel and MCP Hahnemann Universities** Third Annual Research



Day 2001, May 1, 2001. <http://www.research.drexel.edu/>. Poster proposal accepted. Linda Marion and Elizabeth McCalmont, Research Assistant, will present.

### ***E. Evaluation Plan***

The evaluation plan has been developed and a draft has been submitted to IMLS for review.

**Content Editor: Carol H. Montgomery, Ph.D., [montgoch@drexel.edu](mailto:montgoch@drexel.edu)**

Modified: 12-Oct-2004

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## **INTERIM NARRATIVE PROGRESS REPORT (Second) April 1, 2001 through September 30, 2001**

### **The Transition to an Electronic Journal Collection: Measuring the Operational and Economic Implications**

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The primary activities during this phase of the project were continued data collection, organization and analysis of data; a major refinement of the staff time analysis; and presentations of the methodology and preliminary findings.

The project is progressing more slowly than expected for two reasons. First, the project required hiring two temporary staff, a Senior Researcher and a Research Assistant, for one year. I learned of the award the third week of September 2000 and the grant period began October

1, 2000. It took until December 1 to recruit and hire the Senior Researcher, and until January 1 to hire the Research Assistant. Given the need to train these staff, the work did not begin in earnest until after January 1, 2001, three months after the start of the funding period. Second, the Senior Researcher left the project suddenly for personal reasons in mid-June 2001 after a little over six months. This was a setback. The Principal Investigator (PI), who is also the Dean of Libraries at Drexel University, could not devote the amount of time required to complete the project by the end of September. And, it seemed very unlikely that that it would be possible in the remaining time to hire and train a person who could complete the project in three and a half months.

For these reasons, a one-year, no-cost extension with a revised budget was requested and approved. The major budgetary change was a shift of the IMLS funds that would have been paid to the Senior Researcher to support (1) a small percent of the PI's salary in the second year, and (2) to pay \$5000 for the assistance of Dr. Bruce Kingma, a consultant who is an expert in library economics. Dr. Kingma has performed research very similar to the IMLS-funded Drexel study and has written extensively about library economics. The second edition of his book, *The Economics of Information: A Guide To Economic And Cost-Benefit Analysis For Information Professionals* has just been published.

In retrospect this situation has some advantages. IMLS asked that data collection and analysis continue into the second year and that the PI be available to speak about the project at the request of IMLS and at places designated by IMLS. Presumably, this would be after the research generates significant results which will be after the initial one-year funding period. In addition, it would not be possible to perform several of the tasks established in the assessment workshop until the project results are known. Thus, having the project continue formally into a second year with some funding would have been necessary even without the unexpected

staffing problems. The PI has library staff who can perform the project's clerical functions so they will not be neglected.

### **Staff Activity Data Collection**

Collection of data on staff time, a major project activity, continues. Staff now complete time logs on their journal-related activities during the first week of each month. We have sixteen weeks of data entered. During the Summer we realized that the way data was organized needed to be changed. Categories on the staff log sheets were established individually to correspond with the way each staff member viewed his or her job. This was done both to reduce errors and to encourage staff compliance in completing the logs, but led to summary analyses of time and costs by department. Because libraries are organized differently, our analyses would not necessarily apply to other libraries, and so its use would be limited. To solve this problem, we developed a classification by common cross-departmental types of activities and wrote a program to convert the activities on the individual log sheets to one of the types. See enclosed IMLS PROJECT CLASSIFICATION BY ACTIVITY TYPE.

We have also written programs that translate staff time to dollars based on pay scale categories. Patterns are beginning to emerge, although they are complex and have not been analyzed fully.

### **Other Data Analyses**

Other analyses have focused on subscription costs, another exceedingly complex topic. There is no standard definition of an electronic journal, and there are so many pricing models that electronic journal costs are difficult to determine. This makes comparing the cost of print and electronic journals difficult. To compound the problem it is not possible to obtain complete,

comparable data on the use of electronic journals. We have developed operational definitions of categories of electronic journals and worked through the issues because we believe that cost per use is the most meaningful measure of a journal's value to a library. Some preliminary data has been given in the presentations listed below.

## Bibliography

The project bibliography has been updated continually. We collect papers on electronic journals in the following categories:

- *Economics*: Costs of electronic journals, especially electronic versus print. Emphasis on library operations costs as opposed to subscription costs. Exclude costs to publishers.
- *E-journal Management*: Issues related to library management of e-journals.
- *Metrics/Statistics*: Counting e-journal use.
- *Preservation/Archiving*: Descriptions of major archiving projects for e-journals. Not web site or specialized digital libraries.
- *Research Methodology*: Articles on measuring library costs that contain data. Some methods papers from other fields.
- *User Behavior and E-journals*: Limit to research studies with data.

The number of publications in these areas has increased markedly since this project began. However, most are reports of local efforts or opinion articles, not reports of research or even hard data.

## Web Site

The project web site is being kept up-to-date. The bibliography was added during this reporting period.

Carol H. Montgomery, Ph.D.

Content Editor: Carol H. Montgomery, [montgoch@drexel.edu](mailto:montgoch@drexel.edu)

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## Interim Narrative Progress Report Year 2 (October 1, 2001-September 30, 2002)

### The Transition to an Electronic Journal Collection: Measuring the Operational and Economic Implications

IMLS 2000 National Leadership Grant NR-00027

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#### Summary

During this second year of the project all the data collection and all the analyses within the scope of the original funded project were completed. Donald W. King, a long-time leader in the fields of library economics and scholarly communication, joined the project as a consultant. He played a key role in the data analysis. Mr.

King also conducted a survey of the Drexel faculty and graduate students in order to determine the effect of Drexel's shift to an

**electronic journal collection on the faculty and doctoral students; this survey served to validate some of the use patterns as measured in the library impact study. The collaboration between Mr. King and the project's Principal Investigator has led to co-publication of three journal articles, a news item in another major journal, an invitation to lecture at an international summer school, the acceptance of five proposals for presentations at national meetings, and two presentations at meetings of a local consortium. In order to provide travel expenses for meetings and other potential speaking opportunities, IMLS approved a no-cost extension for a third project year that will focus on dissemination, including preparation of a book-length manuscript that presents and documents the electronic journal/print journal cost model.**

### **Activities**

**After refinement as a result of attendance at the IMLS-sponsored workshop on outcomes evaluation, the goals of the project were refined to be measurable as follows:**

- . Analyze the impact of the migration to an electronic journal collection on the Drexel Library as a case study**
- . Develop a model for studying these costs that can be used by others**

### **Impact of an Electronic Journal Collection on the Drexel Library Data Collection and Analyses**

**The data collection and analyses were completed in July 2002, and a preliminary report was prepared in August for the Ticer**



**International Summer School on the Digital Library held in Florence, Italy in early September. An article reporting the project results appeared as the lead article in the October issue of D-Lib Magazine. Rather than repeating that information here, a copy of that article is appended. The URL, given below, is also in the Project Related Bibliography (Montgomery and King, 2002). .**

#### **Development of a Model for Use by Others and Documentation of the Model**

**The model is also described in the D-Lib article. However, additional documentation is needed to make the model easy for others to use. That documentation is progressing under the leadership of Mr. King with an expected completion date of February 2003. Current plans are to write a book-length manuscript and to seek a publisher in addition to posting on a web site. While this field is advancing rapidly, the issues appear to be sufficiently well-defined now that a book on this topic should have enduring usefulness.**

#### **Evaluation**

**The project evaluation consists of both formative and outcome criteria. Formative measures are the completion of the Drexel case study and the cost model. Both these goals have been achieved. However, full documentation of the model will increase its usefulness.**

**The outcome criteria are to (1) influence library and university administrators to change their behavior based on the results and (2) adopt the methods by researchers to study other libraries. These outcomes are difficult to measure, particularly in the short**

**time the project has been completed. As a result some interim indicators were identified as follows.**

- . Papers Published, Presentations Made, Invitations to Make Presentations So far the Principal Investigator has published 9 papers, made 12 presentations, and received two speaking invitations, sometimes with other project staff as co-authors, related to the project.**
- . Consultancies The Principal Investigator was invited by the library building planning group at Clarkson University in Potsdam, NY to consult on the issues of space needs of electronic versus print journal collections.**

**The Project Consultant, through a contact made by the Principal Investigator, is consulting on journal space needs for the Mellon-funded JSTOR project.**

**The Principal Investigator was invited to serve on the Elsevier Science North American Advisory Committee.**

- . Web Site Use After averaging less than 100 web site hits in the first six months of 2002, hits jumped to 160 in August, just after a July presentation at the International Association of Technological University Libraries in Kansas City, MO and reached 188 in October when the D-Lib article reporting the project results was published. Hits on the Principal Investigator's home page increased according to the same pattern: an average of 110 in early 2002 to 175 in August and 250 in October. Hits on the Principal Investigator's site most**

likely are related to the interest in this project.

- **Interactions with Practitioners** The Principal Investigator responded to a request on the Lib-License listserv for information on the print/electronic journal cost tradeoffs. In addition, she has received 12 inquiries from practitioners as a result of papers and presentations.
- **Mr. King is using the project data and models in teaching a course at the University of Pittsburgh's Department of Information and Library Science on library economics, and the Principal Investigator lectures regularly to classes in Drexel's College of Information Science and Technology. These interactions have the potential to influence future practitioners.**
- **Influencing Researchers** With Mr. King's help the University of Pittsburgh libraries are conducting a study modeled after Drexe's IMLS study, and he is considering using the methodology to study a group of medical libraries. In addition, the JSTOR project on which Mr. King is consulting, aims to measure journal storage costs.

### **Project Related Bibliography (complete to date)**

#### **Publications**

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*Technology for Digital Libraries, Fourth European Conference, ECDL 2000, Lisbon, Portugal September 18-20, 2000 Proceedings. Lecture Notes in Computer Science Vol. 1923. Heidelberg, CE, Bertelsmann Springer, 413-7.*

Presentations

Forthcoming

Montgomery, Carol H. and King, Donald W. 'An "All" Electronic Journal Collection in a University Library: Two Years Later.' Presenters. *ACRL 11th National Conference: Learning to Make a Difference*, Charlotte, NC, April 10-13, 2003.

**Boyce, Peter; Montgomery, Carol H.; King, Donald W.; and Tenopir, Carol. "How Are Electronic Journals Changing Patterns of Journal Use?" Presenter. 2003 NASIG Annual conference, "Serials in the Park: Blazing Diverse Trails in the Information Forest," Portland State University in Portland, OR, June 26-29, 2003.**

**Completed:**

**"Comparing Library and User Related Costs of Print and Electronic Journals: A First Step." Speaker. PALCI Fall Membership Meeting, University of Pittsburgh, PA, November 7-8, 2002.**

**"An Electronic Journal Impact Study: The Factors that Change When an Academic Library Migrates from Print." Presenter. 2002 LITA National Forum, Houston, TX, October 11-13, 2002.**

**"Assessing the Costs of Electronic and Print Journal Collections." Guest Lecturer. Ticer International Summer School on the Digital Library 2002: Course 3: Electronic Publishing, Florence, Italy, September 29 to October 3, 2002.**

**"An Electronic Journal Impact Study: The Factors that Change When an Academic Library Migrates from Print." Poster Session accepted. American Library Association 2002 Annual Conference, Atlanta, GA, June 13-19, 2002.**

**"An Electronic Journal Study: Factors that Change When a Library Migrates from Print to Electronic." 23rd Annual Conference of the International Association of Technological University Libraries (IATUL), Kansas City, MO, June 2, 2002.**

**"An IMLS National Leadership Research and Demonstration Grant in an Academic Library." Academic Library Advancement and Development Network (ALADN), San Antonio, TX, March 18, 2002.**

**"Print to Electronic at Drexel: Implications of an "All" Electronic Journal Collection." HELIN Consortium Annual Meeting, Providence, RI, January 10, 2002. [[PowerPoint](#) ]**

**"Print to Electronic: Measuring the Operational & Economic Implications of an Electronic Journal Collection." Library Research Seminar II, College Park, MD, November 2, 2001.**

**"Print to Electronic: Measuring the Operational and Economic Implications of an Electronic Journal Collection." Poster Session. ACM/IEEE Joint Conference on Digital Libraries, Roanoke, VA, June 25, 2001.**

**"From Print to Electronic: Measuring the Operational and Economic Implications of an Electronic Journal Collection." Poster Session. NASIG 2001:A Serials Odyssey. The 16th Annual North American Serials Interest Group Conference, Trinity University, San Antonio, TX, May 23-26, 2001.**

**"Managing the Transition to an Electronic Journal Collection." [[PowerPoint](#) ] PaLA Annual Conference, Lancaster, PA, September 24-27, 2000.**

**"The Economic Impact of an Electronic Journal Collection on an Academic Library" [[PDF PowerPoint](#) ]. Presented at ECDL2000 - Fourth European Conference on Research on Advanced Technology**

for Digital Libraries. Lisbon, Portugal, September 18-20, 2000.

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**Content Editor:** Carol H. Montgomery, [montgoch@drexel.edu](mailto:montgoch@drexel.edu)

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## Interim Narrative Progress Report Year 3 (October 1, 2002-March 31, 2003)

### The Transition to an Electronic Journal Collection: Measuring the Operational and Economic Implications

#### IMLS 2000 National Leadership Grant NR-00027

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## Introduction



In order to provide travel expenses for meetings and other potential speaking opportunities IMLS approved a no-cost extension for a third project year that focuses on dissemination, including preparation of a book-length manuscript that documents the electronic journal/print journal cost model. The results of this project were given in three publications and four presentations during the time period covered by this Interim Report. Four more presentations will be given in the final six months of the project. The complete project bibliography is shown below.

### Publications

King, Donald W., Boyce, Peter, Montgomery, Carol H. and Tenopir, Carol. "Library Economics Measures: Examples of the Comparison of Print & Electronic Journal Collections." *Library Trends*, 51:3, 376-400, Winter 2003.

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Boyce, Peter, Montgomery, Carol H., King, Donald W. and Tenopir, Carol. How Are Electronic Journals Changing Patterns of Journal Use? Panel. 2003 NASIG Annual conference, "Serials in the Park: Blazing Diverse Trails in the Information Forest," Portland State University in Portland, Oregon, June 26-29, 2003.

Montgomery, Carol H. and King, Donald W. An "All" Electronic Journal Collection: Operational and Cost Implications. Poster Presentation. 2003 NASIG Annual conference, "Serials in the Park: Blazing Diverse Trails in the Information Forest," Portland State University in Portland, Oregon, June 26-29, 2003.

Montgomery, Carol H. and King, Donald W. Migrating to An "All" Electronic Journal Collection: Impact on Library Operations and Users. MLA/SLA QuintEssential Conference, Philadelphia, PA, October 26-28, 2003. (Invited)

Boyce, Peter, King, Donald W., Montgomery, Carol H., and Tenopir, Carol. The Influence of Electronic Journals on Scientists' Information Seeking and Reading Habits. EDUCAUSE, Anaheim, CA, November 4-7, 2003.

#### Completed

Montgomery, Carol H. Measuring the Cost of Migrating to an "All" Electronic Journal Collection: A First Step. Presenter. Mitchell Memorial Library, Mississippi State University Seminar: "Working Together to Solve the E-Journal Puzzle," Mississippi State, MS, April 25, 2003.

Montgomery, Carol H. An "All" Electronic Journal Collection: Operational and Cost Implications." Poster Presentation. Research Day, Drexel University, Philadelphia, PA, April 22, 2003.

Montgomery, Carol H. and King, Donald W. 'An "All" Electronic Journal Collection in a University Library: Two Years Later.' Presenters. ACRL 11th National Conference: Learning to Make a Difference, Charlotte, NC, April 10-13, 2003.

"Comparing Library and User Related Costs of Print and Electronic Journals: A First Step." Speaker. PALCI Fall Membership Meeting, University of Pittsburgh, PA, November 7-8, 2002.

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"Print to Electronic at Drexel: Implications of an "All" Electronic Journal Collection." HELIN Consortium Annual Meeting, Providence, RI, January 10, 2002. [PowerPoint <<http://www.library.drexel.edu/facts/staff/dean/MontgomeryHELINSlides.zip>>]

"Print to Electronic: Measuring the Operational & Economic Implications of an Electronic Journal Collection." Library Research Seminar II, November 2, 2001, CollegePark, MD.

"Print to Electronic: Measuring the Operational and Economic Implications of an Electronic Journal Collection." Poster Session. ACM/IEEE Joint Conference on Digital Libraries, Roanoke, VA, June 25, 2001.

"From Print to Electronic: Measuring the Operational and Economic Implications of an Electronic Journal Collection." Poster Session. NASIG 2001: A Serials Odyssey. The 16th Annual North American Serials Interest Group Conference, Trinity University, San Antonio, TX, May 23-26, 2001.

"Managing the Transition to an Electronic Journal Collection." [PowerPoint <<http://www.library.drexel.edu/facts/staff/dean/PALAREv9.zip>>] PaLA Annual Conference, Lancaster, PA, September 24-27, 2000.

"The Economic Impact of an Electronic Journal Collection on an Academic Library" [PDF <<http://www.library.drexel.edu/facts/staff/dean/LisbonWireless.pdf>> PowerPoint <[http://www.library.drexel.edu/facts/staff/dean/lisbon\\_v5ppt.zip](http://www.library.drexel.edu/facts/staff/dean/lisbon_v5ppt.zip)>]. ECDL2000 - Fourth European Conference on Research on Advanced Technology for Digital Libraries. Lisbon, Portugal, September 18-20, 2000.

### Other Activities

Dr. Montgomery, the Principal Investigator, served as a panel member in a Planning Session for a Future MIT Engineering & Science Library, April 1, 2003.

Donald W. King, Project Consultant, is assisting with a JSTOR project to calculate journal costs in 10 academic libraries. The project is funded by the Mellon Foundation. David Robins, a University of Pittsburgh faculty member, is using some of the journal use data for research purposes.

June 20, 2003

Content Editor: Carol H. Montgomery, [montgoch@drexel.edu](mailto:montgoch@drexel.edu)



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Below are links to a select bibliography of resources. Most of the resources are dated from 1995 on. The exceptions are several seminal papers about research methodology.

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**Content Editor:** [Carol H. Montgomery, Ph.D., montgoch@drexel.edu](#)

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## The Transition to an Electronic Journal Collection: Measuring the Operational and Economic Implications

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Carol H. Montgomery, Ph.D., Principal Investigator

**Content Editor: Carol H. Montgomery, [montgoch@drexel.edu](mailto:montgoch@drexel.edu)**



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## Economics

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PEAK (Pricing Electronic Access to Knowledge) - <http://www.lib.umich.edu/retired/peak/>

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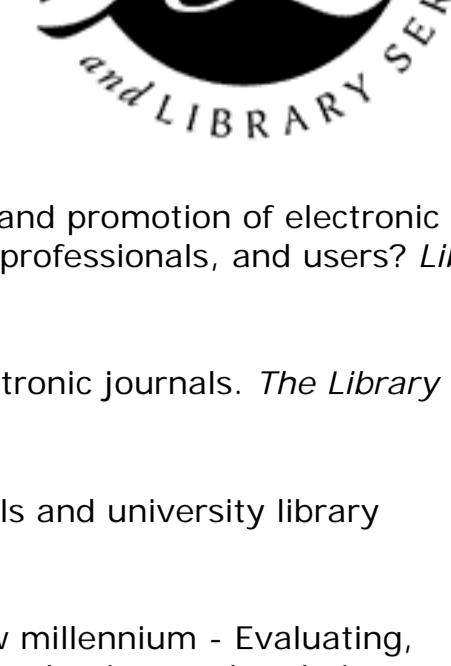


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## E-Journal Management

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Content Editor: Carol H. Montgomery, Ph.D., [montgoc@drexel.edu](mailto:montgoc@drexel.edu)



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## Metrics / Statistics

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Content Editor: Carol H. Montgomery, [montgoch@drexel.edu](mailto:montgoch@drexel.edu)



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## Preservation / Archiving

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**The Cedars Project** - <http://www.leeds.ac.uk/cedars/index.html>.

**The LOCKSS Project (Lots of Copies Keep Stuff Safe)** - Stanford University - <http://lockss.stanford.edu/>.

#### Cooperative Membership Organizations

**Association of research Libraries (ARL)** - <http://www.arl.org/preserv/index.html>.

**Council on Library and Information Resources** - <http://www.diglib.org/preserve/criteria.html>.

**The JSTOR Project** - <http://www.jstor.org/>.

**Online Computer Center Library (OCLC).** <http://www.OCLC.org>. <http://www.oclc.org/oclc/preserv/>.

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#### National Libraries and Archives

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**National Library of Canada (NLC)** - <http://nlc-bnc.ca>.

**UK Digital Preservation Coalition** - Joint Information Systems Committee (JISC) - <http://www.jisc.ac.uk/dner/preservation/dpcintro.html>.

**The British Library Digital Library** - <http://www.bl.uk/>.

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## Link to Metrics / Statistics Project

ARL Statistics and Measurement Program - <http://www.arl.org/stats/perfmeas/>

**Content Editor: Carol H. Montgomery, [montgoch@drexel.edu](mailto:montgoch@drexel.edu)**






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