

Dimensions and Use of the Scholarly Information Environment

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Background & Objectives

The backdrop for this study is that the Digital Library Federation (DLF) has become increasingly concerned by the absence of reliable information with which to document and explain changing patterns of library use in universities and colleges. DLF repeatedly hears from academic library directors that such analyses are vital but missing ingredients of their strategic planning, and of the business case they make to faculty and senior administrators either to win or bolster support for the library and its changing directions.

DLF has committed to drive forward a research process to develop an understanding of the current academic information environment and how end-user behaviors and preferences are affecting library use. The goals of this process are:

- ❑ To develop a better understanding of methods effective in assessing use and usability of online scholarly information resources and information services
- ❑ To create a baseline understanding of users' needs so as to support actionable strategic planning in an increasingly competitive environment for academic libraries and their parent institutions.

Significant progress is being made in achieving the first goal through a number of DLF investments including:

- ❑ A survey by DLF Distinguished Fellow Denise Troll of methods applied by leading research libraries to assess the use and usability of online collections and services¹
- ❑ A survey by DLF Director Daniel Greenstein and Indiana University Dean of Libraries, Suzanne Thorin, of the policy, organizational and financial environments in which leading research libraries are developing their digital libraries²
- ❑ Research by Charles McClure and R. David Lankes into methods for assessing quality in digital reference services³.

To achieve the second objective, the DLF has been working with Outsell Inc., the Council on Library and Information Resources (CLIR), and the directors of eight university and liberal arts college libraries in framing the study described here.⁴ That study will provide evidence of how

¹ A draft of the study results is available upon request from D Greenstein. Information about the study and its aims is available from <http://www.clir.org/diglib/use/useframe.htm>

² The survey instrument and preliminary results are both available from <http://www.clir.org/diglib/roles.htm>

³ .The study is described in detail at <http://quartz.syr.edu/quality/>

⁴ Participants were drawn from the libraries at Carnegie Mellon University, Dartmouth, Marquette, Mount Holyoke, North Carolina State University, Stanford University, University of Illinois at Urbana, and the University of Pennsylvania. Discussion was focused by a white paper prepared by DLF Distinguished Fellow Denise Troll prepared a white paper (see "How and Why Libraries are Changing", January 2001 from

information users view the university and the academic library as part of their overall scholarly information environment. This knowledge will be invaluable for libraries and universities in planning information services to focus explicitly on the current and emerging needs of their faculty and students, and to avoid focusing on what is not, or may no longer be, important. The academic community will also benefit as publishers and content providers that serve the education market create better information products based on an increased knowledge of users' needs.

Although the DLF is able with Outsell to support the study's design, it seeks funding totaling for the study's implementation, notably for data acquisition, analysis, and reporting. Data gathered during the study will be deposited by the DLF with the Inter-University Consortium for Political and Social Research (ICPSR) from where they will be accessible for non-commercial use. Written reports prepared during the study will be made publicly accessible from the DLF's website.

The challenges for academic libraries are myriad, the possibilities limitless, and a deep understanding of end users almost non-existent. With the funds sought here, the DLF proposes to commission Outsell, Inc. to conduct an in-depth study of what information and information services people in universities and liberal arts colleges use to support their research, teaching, and academic learning. It will also reveal something about how those information sources and services are located, evaluated, and used by academic end users at different kinds of institutions and in different disciplines. With these data it will be possible to evaluate the library's current and possible future roles within the broader scholarly information landscape. The data will, in effect, provide essential contextual information that will help to interpret trends in library use that are emerging from studies that focus more narrowly on the development and use of library collections, for example, as identified in statistical compilations of the Association of Research Libraries and the Association of College and Research Libraries.⁵ To demonstrate the possibilities, the DLF intends to follow-up with some of the universities and liberal arts colleges that have been involved with the DLF and Outsell in framing this investigation. Working closely with library directors and their staff, it will assess how results from the study help interpret library trends for which data already exist (e.g. as ARL returns), and how survey results might or should impact upon library planning.

Augmenting this research will be Outsell analysis and models about target market assessment, and considerations for content creation and deployment models that are available to the industry. In addition, this study, the first of its kind, will provide libraries and content providers with an understanding of the changing patterns of information use that affect demand for and use of library collections and services.

<http://www.clir.org/diglib/use/whitepaper.htm>) that focused discussion at a meeting of library directors from eight research universities and liberal arts colleges.

⁵ Significant trends are documented in Troll, "How and Why Libraries are Changing". The paper also documents the need for more contextual information that will help interpret these trends, calling explicitly for information that will help to assess the library's contribution to and role in the broader scholarly information landscape in which scholars, teachers, and learners typically operate.

DLF specifically wants the benefit of:

- ❑ An analysis of the extent and nature of the broader scholarly information landscape as perceived and used by researchers, teachers, and learners at leading research universities and liberal arts colleges
- ❑ A comparative view of how information sources and services on that landscape are located, evaluated, and used by researchers, teachers, and learners in different educational environments and in different disciplines.

As its broad objective, the study will provide academic libraries (and scholarly content providers) with a framework for:

- ❑ Understanding changing patterns of library use in different educational environments and in different disciplines
- ❑ Identifying gaps where information needs are not being met
- ❑ Providing a basis for developing user-driven information solutions and strategies for students, researchers, and faculty at research universities and liberal arts colleges
- ❑ Developing baseline and trend data that may be used by individual institutions to inform strategic, organizational, financial, and human resource planning for universities and academic library collections, services, and facilities
- ❑ Developing and making available for non-commercial use, baseline and trend data that can inform further directly comparable studies, for example, as may be conducted of diverse user communities within a single institution of higher education, or across a broader range of higher education institutions than are represented here.

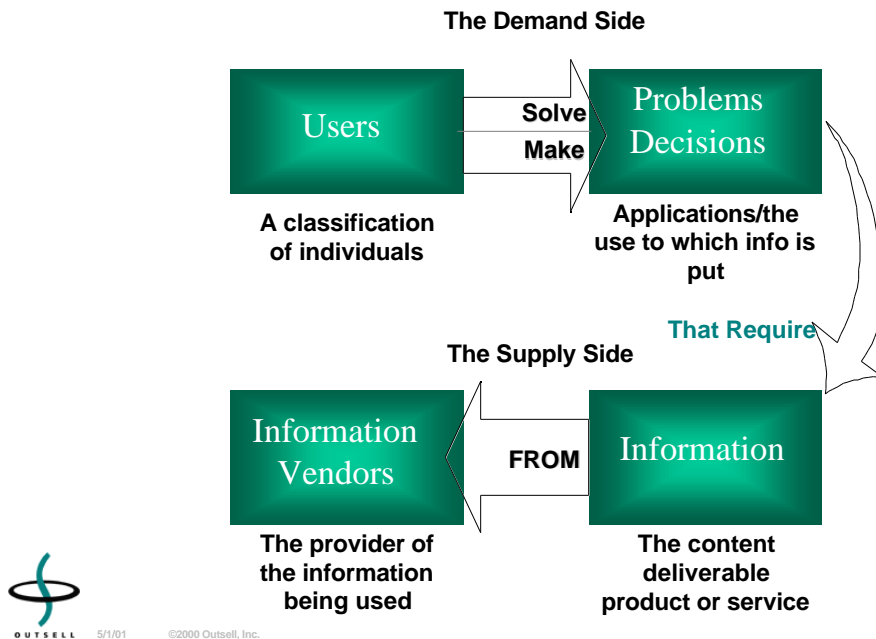
The Academic Information Environment

Fundamental to this research is an understanding of end users and their applications for content, or the information they require to support research, teaching, and learning. The model on the following page illustrates a cohesive view of the demand and supply sides of the information market.

End users, based on their specific functional roles and their institutional affiliations, solve problems and make decisions that require information. As functional roles and needs change, users apply and use information differently, which requires providers of information (libraries, publishers, and other intermediaries) to create and deploy content and services based on a clear understanding of the needs of the demand side of the information equation.

The higher education market consists of academic institutions of varying types, sizes, and geographies. There are research and doctoral universities, comprehensive universities, regional universities, general and liberal arts colleges, and community colleges. Throughout the education market, students and faculty tend to behave in the context of their chosen segment of the education environment and their functional role and discipline. While there are parallels in the needs of users across types of academic institutions, there are important differences. An understanding of the information needs, applications and uses at each intersection of Functional

Information Industry Model



Groups of Users (FGUs) and institution type will create a better assessment of education market information needs and what motivates each particular segment of the market. This study proposes to identify the information needs, applications, and uses at the three institution types:

- ❑ Leading public (state funded) research and doctoral universities
- ❑ Leading private research and doctoral universities
- ❑ Leading private liberal arts colleges.

Recognizing the potential significance of this research, the survey data and appropriate documentation will be offered for deposit with the ICPSR from where it can be made available for non-commercial educational re-use. In addition, Outsell will maintain a non-exclusive right in the data and an exclusive right in the survey instrument and survey and reporting methodologies. In these ways, it is hoped the initial research will be extended to include target institutions not represented here, for example, master's colleges and universities, general second and third tier liberal arts colleges, community colleges, etc.

Specific information gathered for this study will reflect hypotheses about how library use changes in part to reflect changes in the scholarly information landscape that are wrought by pervasive network access and the proliferation of networked information sources and services. Although the survey instrument has yet to be designed it will gather data to help address specific hypotheses. Some of the hypotheses that have shaped our thinking in framing this study are set out below alongside summary statements of the kinds of questions they encourage us to pose.

Hypothesis	Question addressed by data
<p>1. The scholarly information landscape is a complex and evolving combination of information sources and information services, only some of which are managed by the campus academic library.</p>	<p>Is it possible to depict the academic work environment in which faculty, researchers, and students engage to meet their study, research, and teaching needs? What are the top sources of scholarly information used by students, faculty and researchers? How do the FGUs see the scholarly information environment? How do libraries fit into that picture?</p>
<p>2. The nature and use of the scholarly information landscape varies by institution type and by discipline.</p>	<p>How do higher education students (freshmen to graduate), and faculty and researchers (at different levels) use information to support research, teaching, and learning (hereafter, scholarly information)? How do these needs vary among academic discipline and type of institution?</p>
<p>3. Information use is conditioned by numerous factors including considerations about its quality, ease and speed of access, etc.</p>	<p>What scholarly information do the FGUs use? What do they need? Do they verify scholarly information sources? How do they determine quality and authoritativeness of scholarly information? What problems and barriers do users face in their use of scholarly information? What other factors shape scholarly information application and use?</p>
<p>4. Libraries need to promote themselves in a networked environment where they are no longer so obviously the sole or most accessible provider of scholarly information.</p>	<p>How do users prefer to access scholarly information? Where do they go first to search for scholarly information, and why? How do users self-assess their readiness and ability in seeking scholarly information? What influences do users recognize as shaping the way they seek, evaluate, and use scholarly information? How do these needs vary among academic discipline and type of institution?</p>
<p>5. Academic libraries have distinctive and vital roles to play in an evolving networked scholarly information landscape.</p>	<p>What unmet needs for scholarly information do users have? What content and services should academic libraries provide to match the needs of users? What do the findings suggest for the design of tomorrow's academic library and information environments?</p>

Study Design

We have determined that an optimal methodology will be to focus on three institution types, including leading public (state funded) and private doctoral research universities, respectively, and liberal arts colleges. These institution types have been selected for the following reasons:

- ❑ Members of each group are self-defined, easily identified, and reasonably consistent with regard to their mission-driven orientation towards research and teaching, respectively.
- ❑ The groups, taken together, allow us to conduct analyses that may be indicative of differences between institutions grouped in other ways, for example, by their emphasis on teaching (the liberal arts colleges) or research (the universities), by the size of their total populations, by the level and source of their funding, and by the cost of tuition. It may also be possible to explore differences between more and less residential institutions.
- ❑ Library provision is reasonably well and comparably documented for these institutions, e.g. in the statistical reports that are developed by the Association of Research Libraries, the Oberlin Group of liberal arts colleges, and the Association of College and Research Libraries. Such data will be essential to the research, allowing it to analyze the library's role in a broader scholarly information landscape.
- ❑ Library provision at these institution types is of particular interest to the DLF and to its administrative host, the Council on Library and Information Resources (CLIR). The organization conducting this investigation will therefore have particular and nuanced understanding of the various influences that operate on these libraries, on their historical development, and on their future possibilities.

For the purposes of this study, we propose to use a modified version of the current Carnegie Classification for identifying institutions for the sample. Specifically, we have drawn on the following Carnegie Classification categories as follows:

Study classification	Carnegie Classification
Leading public (state funded) research university	Doctoral Research Universities – Extensive – Public Institutions
Leading private research university	Doctoral Research Universities – Extensive – Private Not-for-Profit Institutions
Leading liberal arts college	Baccalaureate Colleges – Liberal Arts – Private Not-for-Profit Institutions

We will also collect institutional and individual demographics in order to analyze the results based on attributes such as relative size of library, source of funding, level of endowment, cost of tuition, total population, residential vs. non-residential living.

Questionnaire Design

Outsell will conduct quantitative telephone interviews among qualifying respondents in each of the segments of interest. The interviews will be conducted by telephone during normal business hours among faculty and during day and evening hours among students. The interviews will take no more than 20 minutes to complete and will contain no more than 50 questions (with up to 4 open-ended questions).

There will be one primary interview questionnaire with specific questions and response sets tailored for each FGU or institution type, as needed. The interview questionnaire (with its specific questions and response sets) will be developed in collaboration between Outsell and the DLF during a study design phase that will run to 15 September 2001 and be supported jointly by the DLF and by Outsell.

The interview questionnaire will benefit from using Outsell's Taxonomy for Segmenting the Information Marketplace into information types, Outsell's Information Needs Assessment and past I-AIM™ questionnaires as guides. The questionnaire will also benefit from input by scholars and library information professionals representing the institution types to be covered by this study. That input will be gathered at a review meeting to be hosted by the DLF by early September 2001. Topics addressed by the survey questionnaire will include:

- ❑ Role and responsibilities within institution
- ❑ Information needs and use including information dependencies
- ❑ Information needs not addressed by current sources
- ❑ Sources no longer needed
- ❑ Use habits and preferences (including the influences that shape them) regarding information
- ❑ Problems and drawbacks using information
- ❑ Use and evaluation of information resources (i.e., Library, Intranet, Internet)
- ❑ Profile and demographic information about the users

Surveying Methodology

The telephone interviews will be conducted by an Outsell approved data collection facility (chosen for quality of interviewing and data consistency) and will commence after 15 September 2001 as soon as funding for the implementation phase of the study is secured. The questionnaire will be programmed using Computer Assisted Telephone Interviewing (CATI) software. Each interviewer and supervisor will be fully briefed by an Outsell project manager on the purpose of the research and questionnaire specifics. The Outsell project manager will randomly and periodically monitor the interviews to assure consistency and quality. Outsell will be identified as the sponsor of the research. Interview results will be processed and cross tabulations will be developed (banner points will be FGUs, institutions, disciplines and total). Respondents who complete the survey will be eligible for one of 15 cash drawings (each winner will receive \$200 cash).

The table below indicates the number of interviews to be completed for each audience segment in each institution type.

	Faculty	Grad. Students	Undergrad. Students	Total
Leading Doctoral Research University, public	TBA	TBA	TBA	900
Leading Doctoral Research University, private	TBA	TBA	TBA	750
Baccalaureate Colleges - Liberal Arts, private	TBA	TBA	TBA	1600
Total	950	1150	1150	3,250

Note: The numbers in the table above are estimates based on research that Outsell is conducting in preparation for this study into the size and demographic of the institution types selected for this study. The numbers will be verified by Outsell when that research is completed in July. At that time Outsell will determine the statistical precision achieved for each cell of the table.

To ensure that we conduct interviews across disciplines within each institution type consistent with the way those disciplines occur in the population, we will will equally divide interviews across disciplines in each institution type and then weight them during the analysis stage of the study. Disciplines to be included are:

- Architecture
- Agriculture & Home Economics
- Business
- Communications
- Education
- Engineering
- Humanities
- Fine and Performing Arts
- Medicine, Dentistry, Vet Medicine & Health-Related
- Law
- Mathematics
- Sciences
- Social Sciences

Outsell is currently investing in research to determine how undergraduates, graduate students, and faculty are distributed across the academic disciplines above in each of the three institution categories. Based on the results of this research, together Outsell and DLF will determine the best sampling methodology for the study.

Sample Specifics

Sample will be obtained from various sources, including Market Data Retrieval (MDR) and Survey Sampling. Sources of sample will be selected based on the comprehensiveness of their targeted sample. For example, MDR has extensive lists of sample by institution for faculty and administrators, while Survey Sampling maintains databases of students. Outsell will obtain the appropriate amount of sample for the study (approximately 15-20 times the number of interviews will be ordered in sample). The sample will be randomized to represent the disciplines in proportion to how they fall in the population. This will insure that the completed interviews also proportionally represent all the disciplines.

Deliverables & Use Privileges

The following outlines the deliverables and the use privileges surrounding those deliverables.

Outsell will provide the DLF with three graphical reports containing Outsell opinion and survey findings about the end-user population surveyed. The three reports will be organized to contain the following respondent segments:

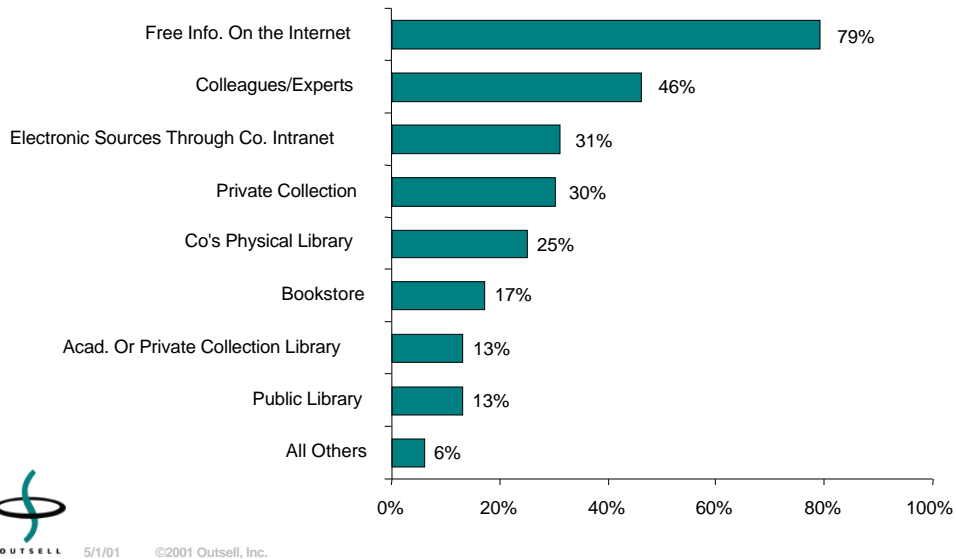
1. Total
2. Functional Groups of Users (FGUs)
3. Institution Types

The reports will be made available in printed and electronic form by the DLF for educational and research use within academic institutions or academic consortia. Electronic editions will be made publicly available from the DLF website in PDF format. Printed editions may be distributed on a cost recovery basis.

The following chart is a sample from Outsell's recent Super I-AIM™ Survey of information needs of corporate end users across 20 industries and 10 FGUs, which is representative of output that will appear in the Total report.

Super I-AIM™ Survey - Total Segment Where Usually Go For Information

9b. When you seek out the information yourself for your job, where do you usually go for the information? (Base = 4275)



The next two charts provide examples representative of how data will be reported in the FGU and Institution Types reports.

Super I-AIM™ Survey - FGUs Preferences for Receiving and Using Information

10. Please indicate the top two formats you prefer for receiving information and the top two formats you prefer for using information. (continued)

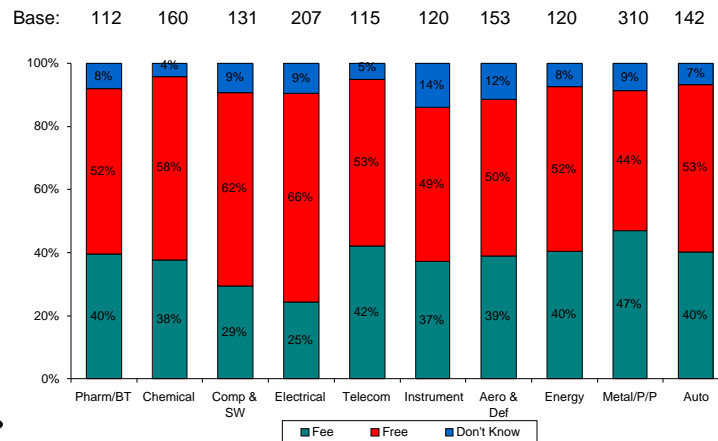
Information Format	Manufacturing		Legal		Purchasing		Information Systems		Human Resources	
	Receiv- -ing	Using	Receiv- -ing	Using	Receiv- -ing	Using	Receiv- -ing	Using	Receiv- -ing	Using
Base	(613) %	(613) %	(206) %	(206) %	(751) %	(751) %	(736) %	(736) %	(805) %	(805) %
Print Form	52	48	52	54	49	47	39	44	51	50
Electronic Format from Internet	47	43	52	45	44	39	63	58	46	39
e-mail	39	38	46	37	48	42	53	42	48	42
In-Person	15	24	16	27	17	21	13	15	13	20
Electronic Format from Co. Intranet	17	14	10	11	10	10	10	11	14	13
By Telephone	10	14	8	7	16	19	7	9	7	12
Some Other Way	3	1	-	-	2	2	1	1	1	-

Super I-AIM™ Survey – Industry (Part 1)

Perceptions of Fee vs. Free Services

16. Please indicate whether each statement applies more to fee-based information services or free information services from the open Internet.

"The Service Contains Information From Credible and Known Sources"



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The reports will be delivered to the DLF in PDF format.

Outsell will also supply the DLF with a complete copy of the survey data, documented according to guidelines recommended by the ICPSR as essential for the data's re-use and long-term preservation.

The DLF will be the owner of and shall retain all copyrights in the data, the data documentation, and the reports produced by Outsell as a result of this study. Outsell will be granted a non-exclusive right to each of these products. Specifically, Outsell will have the right to distribute and re-use the data, the data documentation, and the reports. Outsell also maintains ownership of its pre-existing intellectual property, namely its Taxonomy for the Information Marketplace, its documented Product Development Process for Information Services, and any other proprietary data, information, questionnaires and frameworks that are used for this project. Specifically, the study methodology, including the actual interview questionnaire and the process for gathering the survey data will belong exclusively to Outsell.

Timing Estimate

The study will be conducted in three phases: a design phase, an implementation phase, and a follow-up phase. The design and follow-up phases will be funded by the DLF and supported by Outsell. Funds are being sought to support work during the implementation phase.

Phase 1. Design

Jan – Mar 2001 DLF frames the initiative by developing a white paper ("How and Why Libraries are Changing") and discussing its implications with library directors from research universities and liberal arts colleges

- Apr – Jun 2001 DLF and Outsell develop detailed study proposal in consultation with library professionals at universities and liberal arts colleges
- Jun – Sep 2001 Outsell and DLF design questionnaire in consultation with library directors and scholars
- Jun – Sep 2001 Outsell documents precise dimensions of the sampling universe.

Phase 2. Implementation

The implementation phase can commence from September 15, 2001 as soon as funding is secured. It will involve data collection, analysis, and reporting. The following timetable is indicative and assumes that funding is secured by September 15, 2001. The listed tasks will be undertaken by Outsell.

- Sep 16 – Oct 6 Programming and quality assurance of questionnaire
- Oct 7 – Nov 24 Fielding of questionnaire among FGUs
- Nov 25 – Dec 31 Processing and analyzing of data
- Jan 2 – Jan 26, 2002 Reporting

Phase 3. Follow-up

Two activities are envisaged for a follow-up phase that will take place in February and March 2002. Although the DLF will be responsible for both of these activities, it is important to recognize the contingencies that may determine their successful completion.

- Feb – Mar 2002 Data archiving. The DLF will take responsibility for offering the data for deposit with the ICPSR following ICPSR data deposit guidelines.
- Feb – Jun 2002 Developing case studies. Here the DLF will work with representatives of the eight institutions that convened in March 2001 to assist the DLF and Outsell in framing this study. The aim is to prepare a number of brief case studies demonstrating how our enhanced understanding of the scholarly information landscape’s dimensions and use helps to interpret existing trend data on library use (e.g. as collected by ARL) and impacts on library planning. Individuals who convened in March have agreed in principal to participate in this follow up activity. They are drawn from the libraries at Carnegie Mellon University, Dartmouth, Marquette, Mount Holyoke, North Carolina State University, Stanford University, University of Illinois at Urbana, and the University of Pennsylvania.

Implications of this Research

Academic information end users rely on a widely distributed and diverse information environment. This makes understanding and reaching end users a tremendous challenge. A main purpose of this research is to provide analysis to help identify how universities, academic libraries, and information providers can best serve each segment of the academic end user market. With this research in hand, these information providers will be better able to:

- ❑ Assess implications for their current strategies
- ❑ Understand implications for the university, the library, and the vendor for deployment of external content
- ❑ Read shifting patterns of demand for traditional library services to electronic delivery of information to the desktop
- ❑ Create more relevant and targeted information products and services for each user market segment
- ❑ Identify under-served user segments and create offerings to meet these needs
- ❑ Understand the scholarly information environment that engages academic information users and create actionable strategies for deploying content and services as a relevant part of that environment
- ❑ Identify potential alliances and partnerships for better serving the academic end user.