This is a proposal submitted by Cheryl Knott Malone and Anita Coleman, School of Information Resources and Library Science, University of Arizona, Tucson to the IMLS National Leadership Grants 2005.

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The following additional documents that were a part of the original proposal application package are not included here:

- IMLS Application Checklist which includes the Budget Forms and Partnership Statements
- JELIS Digitization and Open Access Project Report (Product from Ongoing Project of Similar Nature) By Cheryl K. Malone and Anita S. Coleman
- Unpublished History of JELIS (in support of Needs Assessment - see Page 4) By Unknown Author (received from the ALISE Management Company, IIA, 01/20/05)

ABSTRACT

To what extent does open access improve the impact of an article? This is the deceptively simple question that we will investigate. Our question is an important one if a clear understanding about the open access archive (OAA) phenomenon and what it means for our discipline, Library and Information Science (LIS) is ever to be achieved. We will use DLIST as the testbed for answering our key research question.

DLIST is the Digital Library for Information Science and Technology <http://dlist.sir.arizona.edu>, an OAA, where scholars can self-register and deposit research, education, and practice publications that center on cultural heritage institutions such as libraries, archives, and museums. DLIST was established in the summer of 2002 as a disciplinary repository for LIS. DLIST runs on open source software, Eprints, and is compliant with Open Archives Initiative-Protocol for Metadata Harvesting (OAI-PMH). Thus DLIST is an interoperable data provider in the global chain of OAI repository services. Currently DLIST has about 500 users and 400 documents. Usage of DLIST has grown from 41,156 hits in February 2004 to 112,728 hits in January 2005.

To answer the research question we will undertake the following activities over a period of three years. In the first year we will 1) digitize articles from the back issues of the *Journal of Education for Library and Information Science (JELIS)*, the premier journal for all matters related to library education; 1) conduct a citation study of JELIS articles to benchmark their research impact prior to deposit in DLIST, 2) deposit and create the metadata for digitized *JELIS* articles in DLIST; and 3) complete the writing of a *DLIST User Guide and Self-Archiving Workshops* manual. In the second year of the project, we will 1) survey LIS faculty to determine a baseline of copyright awareness and scholarly communication behaviors related to self-archiving in the LIS education community, and 2) offer DLIST self-archiving workshops at four selected conferences. The workshops will introduce scholars to OAA and how to self-archive using DLIST. In the third year of the project, 1) participants who completed the DLIST workshops and surveys will be surveyed again, 2) a follow-up citation study to document citation rates and patterns of the digitized and deposited *JELIS* articles will be conducted, and 3) will be analyzed with usage of *JELIS* articles in DLIST to understand the impact of open access. The goal of the second survey is to determine how behaviors may have changed and find out how the *JELIS* articles in DLIST, were used in ways that may not be revealed through mere citation data. This will contribute a richer understanding of impact than if we had only quantitative data from DLIST usage logs and citation rates and patterns (traditional research impact factors only) for *JELIS*.

Current experience with DLIST has given us tantalizing evidence that open access to the *JELIS* articles will have an impact and that the nature of the impact will be diverse and rich, not just limited to research citations. For example, informally gathered DLIST usage 'nuggets' are often about the usefulness of DLIST materials for classroom teaching (sometimes in a global context, as when we learned that it is used in a LIS school in Czechoslovakia) and networking among LIS teachers, researchers and practitioners.

Narrative:

The Impact of Open Access on Library and Information Science has one major goal: to rigorously study and understand the complete and full nature of the impact of open access to full-text publications in Library and Information Science (LIS) education. Our key research question, to what extent does open access improve the impact of an article?, invokes a number of related questions. In the next two sections on Assessment and Need and National Impact and Intended Results we explore the following questions and set the context of our research. What is open access? Why should we study the impact of open access on LIS education? What are the implications of open access for LIS education and scholarship?

1. Assessment and Need

Access to information is a beloved traditional value for libraries; but the ***open access*** movement is a relatively modern phenomenon related to digital information that is only slowly becoming an integral part of the library world. According to Peter Suber, who runs *Open Access News*: "Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions." [Suber, 2005]. Open access to all scholarly materials on a global scale is the goal of the OA movement [Harnad, 1995; Odlyzko, 2002] and many solutions to reach this goal have been developed. They range from software for developing archives (for example, Eprints software) to flexible licenses that support open access and yet protect the many rights of creators and publishers (for example, Creative Contents licenses) and registries and protocols for interoperability (such as the Open Archives Initiative Protocol for Metadata Harvesting). Generally, self-archiving in open access archives (OAA) is considered to be the optimal solution. OAA may be disciplinary repositories such as ArXIV (an early discipline-based repository for Physics that had been in existence even prior to Harnad's first call for open access in the early nineties) and CogPrints (cognitive science) or institutional repositories such as those at CalTech and MIT, which developed in response to the slow growth of OAA in some disciplines. A complete and searchable list of OAA is available through OAISTER and there are approximately 396 OAA with 5 million digital resources [OAISTER, 2005]. However, this is a small amount when we remember that approximately 950,000 books are published per year and there are about 37, 609 scholarly periodicals [Ulrichs Periodicals Directory]. Despite the rhetoric and success of OAA, much remains to be accomplished especially with regard to OAA in LIS.

The Association of Research Libraries (ARL) and institutions such as IMLS have been active in the OA arena. But there is still a need to study the OA movement and its role in LIS and LIS education. In 2002 there were no OAA for LIS, and DLIST was established by SIRLS at the University of Arizona in response to findings that were percolating down from the OAA movement that: 1) scholars prefer disciplinary repositories to institutional ones; and 2) library and information professionals are critical players if the OA movement is to succeed. DLIST is the Digital Library for Information Science and Technology; scholars can self-register and deposit research, education, and practice publications that center on cultural heritage institutions such as libraries, archives, and

museums. DLIST runs on Eprints, OAI-PMH compliant, open source software. Currently DLIST has about 500 users and 400 documents. Usage of DLIST has grown from 41,156 hits in February 2004 to 112,728 hits in January 2005. Despite the successes, the problems that plague all OAA continue to affect DLIST too.

Our own experience in running DLIST, the slow growth of content in OAA including institutional repositories, and research evidence from studies such as RoMEO in the UK and the Rochester study in the US reveal that the problems facing OAA are often cultural, social, legal, and economic, not merely technological: 1) Many scholars do not consider the sharing of scholarly materials openly, prior to or after formal publication as part of their scholarship charge; 2) the traditional print journal still dominates as the preferred form for research results dissemination; 3) journal/publisher copyright transfer agreements constrain open scholarly communication and discourage faculty innovation in pursuing alternate publishing models; and 4) the fast growing acceptance of publication charges by scientists (authors pay to have papers published), and changes in technologies of publishing and dissemination models are unnerving to the majority of social science and humanities scholar who still work alone on un-funded research. Scholarly communication consortia held at universities that bring scholars from many different disciplines to foster the development of institutional repositories highlight these barriers over and over again. Interestingly, despite the lack of interest in 'repositories' most scholars would like their materials to have the widest possible visibility and availability (which is why many seek to publish in high impact journals). Triggered by the Nature debates in response to the "Online or Invisible" article by Lawrence [2001], proponents of OAA and others (for example, the huge publishing firm ISI Thompson) have begun to study the research ***impact*** of open access journals [Hitchcock et al, 2003; Testa & McVeigh, 2005; Harnad & Brody, 2004; Swan & Gibbons, 2004a, 2004b; Foster & Gibbons, 2005].

Impact is also another library value (information and knowledge bestow power) and ***impact factors*** have a rich intellectual tradition in LIS from bibliometric studies. Traditional measures of research impact are citation counts for the article, citation counts for the researcher, citation counts for the journal, and co-citation or co-text maps; we draw citation images, dendograms, and other networks to reveal invisible colleges, research fronts, and influences in a discipline. OAA have unleashed other measures to estimate research impact such as: citation counts for the preprint phase (form of document prior to refereeing), usage measures ("hits" "sessions" "visits" and other web metrics) for preprints and postprints, time-course analyses, early predictors, etc., usage/citation correlators and predictors, downloading, and per article readership information. But as networked information and the World Wide Web pages have proliferated, research impact as the only measure of disciplinary scholarship has also come under attack. In the waxing of a discipline and waning of journal impact researchers showed that impact on a discipline or a community may be different from computations about journal impact. There have also been sporadic calls on the LIS electronic discussion list, JESSE, and in the LIS informetrics (citation studies) literature for citation indexes that measure the influence of scholarly publications by counts of mentions or web links or citations in other online products such as course websites and

online syllabi, not just research citations [JESSE; Coleman, 2005]. Further, university tenure and promotions committees consider not just a faculty member's publications but whether those publications had impact, typically indicated by their being cited by others. In LIS, however, impact also involves the extent to which practicing library and information professionals read, use, and apply the research of LIS educators. Impact among practitioners is also measured largely through citations as when librarians publish in LIS journals. While there are many studies of journal usage and impact factors of open access versus closed journals, no citation study of the Journal of Education for Library and Information Science (JELIS) has been conducted nor have there been studies to document the rich and varied nature of open access ***impact and its role in the growth of the LIS discipline and professions***.

2. National Impact and Intended Results

Studying the impact of open access by focusing on two critical instruments, namely *JELIS* and DLIST will help in answering many questions that are of great urgency to LIS.

1) **Is there a crisis in LIS education?** Whether we agree or not about a crisis in library education, we must admit that there is at least the perception of a crisis in library education as the literature on this topic and professional discourse shows [Gorman, 2003; King, 2005]. Faculty in LIS schools are charged with focusing on "information" which has led to a diminution of the research about library topics. An increasing divide between LIS faculty and the profession on many issues such as education versus training, nature of librarianship, and composition of core in LIS curricula is touted as another feature of the crisis. What can LIS faculty do to change these perceptions or improve the nature of this discourse? Opening access to *JELIS* articles by making them available on an OAA such as DLIST and conducting a citation study of *JELIS*, which among other things, will analyze the proportion of LIS faculty who publish on LIS education and matters central to the library, are critical steps. They not only contribute research evidence to the argument but shape faculty scholarly communication behaviors in influential yet consistent ways that reflect the values of traditional cultural heritage institutions.
2) **How does communal knowledge grow in LIS education?** "Papers that are ignored are functionally equivalent to those which were never written, they have no impact on the growth of communal knowledge." [Cole, 2000] While citing behavior cannot be equated with use behavior, there is an important point being made here: what is the impact of articles in *JELIS*? Who reads them? Where are they cited? Understanding the citedness of *JELIS* is extremely important because *JELIS* is not considered a high-impact journal – it is not listed in *Journal Citation Reports* for the area of LIS. As part of a pilot study (see attached 1996 JELIS Digitization and Open Access Report) *JELIS* articles were retrieved in the *Web of Science Social Sciences Citation Index*. The majority of the articles are not cited; but the few that are cited are in high impact research and practitioner-oriented journals such as *Library Quarterly, JASIST*, and *Library Trends*. Another interesting trend appeared to the lack of citations to curricula such as Children's

and Young Adult Literature, School Media, Global LIS Education, and studies on faculty concerns in the research university.

3) **What is the future of ALISE and LIS educational research?** "There is a growth correlation between how much a society publishes and the size of its membership." ALISE, the professional association for those interested in LIS education has been struggling to find an identity distinct from the American Library Association (ALA) and this struggle often reiterates many things that are common to LIS researchers, educators and practitioners [Davis, 2005]. The goal of *JELIS* was to bridge gaps between practitioners and educators and build a global LIS connection. We have very little documented evidence about whether this is being accomplished; we need to accommodate access and understand use of *JELIS* globally, and by practitioners in the US, even how many *JELIS* articles find their way (through citations) into the practitioner literature. (see the attached Unpublished JELIS History). This is critical for the future growth of ALISE.

The OA movement started in 1994 when Steven Harnad posted a "subversive proposal" to an electronic journal mailing list; "a decade later, OA is now threatening to overturn the $6 billion scholarly publishing industry and is forcing even the largest publishers against the ropes." [Poynder, 2004]. In keeping with other research reports about OA, we expect that opening access to *JELIS* back issues via DLIST will:

1) increase the research impact of *JELIS* articles and this will be demonstrated by
    a. times cited in the citation index
    b. growth and distribution rates of articles
2) change in the nature of the discourse about a crisis in LIS education and this will be demonstrated by
    a. informal and formal cites to *JELIS* articles
    b. anecdotes of *JELIS* in DLIST use
    c. increased usage (through author registrations) of DLIST
3) increase the global visibility and impact of *JELIS* articles and this will be demonstrated by
    a. qualitative summaries of diverse uses in education and practice
4) increase in amount of national and global readership (possibly even membership) in ALISE or publication in *JELIS* as demonstrated by
    a. ALISE memberships
    b. *JELIS* publication patterns
    c. DLIST usage (hit, visits, deposits, and downloads)

3. Project Design and Evaluation Plan:

Objectives: To understand the impact of open access on LIS education we plan to conduct a citation study of *JELIS* that establishes impact quantitatively and qualitatively prior to open access and after open access, and two user studies of LIS faculty information and scholarly communication behaviors as related to self-archiving usage of *JELIS* and DLIST, and cross-tabulate these data with DLIST user registration and usage logs to establish usage after open access. In addition, we may seek and use varied other

'gross' data as applicable such as ALISE memberships, *JELIS* subscriptions, and author submissions.

Three methods of data gathering and analysis will be used: citation study of JELIS (units of analysis are the journal article and the journal); user study pre and post open access (online survey); DLIST user registration and user logs (pre and post open access). These are described in further detail below (see also the attached DLIST Fall Report to see the pilot user study and log data analysis; see the attached *JELIS* Digitization and OA report to see the a very small preliminary citation study report).

Methods:

***JELIS* Citation Study**: Since 1960, *JELIS*, and its predecessor the *Journal of Education for Librarianship* (*JEL*) have been the primary vehicle for disseminating the scholarship about LIS education in North America. *JELIS* is not analyzed in *Journal Citation Reports* but articles from both are indexed in the WOS (SSCI). Table 1 shows the breakdown of *JELIS, JEL* articles and document types that are available for citation analysis.

Search terms used	**Number of Hits**
SO=Journal of Education for Library and Information Science (NO LIMIT. All document types)	718
SO= Journal of Education for Library and Information Science (LIMIT|=Article)	393
SO=Journal of Education for Librarianship (NO LIMIT. All document types)	441
SO= Journal of Education for Librarianship (LIMIT=Article)	363

Table 1: Search of WOS on 01/29/05

In Year 1 of the project we propose a complete citation study of *JELIS*; it will be modeled on similar studies about LIS journal and author productivity [Smith, 1999; Budd & Seavey, 1996]. We will gather, analyze, and report data such as the following:
Growth: # of all document types; # of papers per year; # of articles per year.
Article Distributions: by individuals; by institutions; by US states and countries; by topic (we will use DLIST subjects and ALISE Areas of Research Classification); by event coverage (for example, how many events and what types of events were covered); by citations in other journals (journal titles, names of citing authors; titles of articles, type of publication characterized as either research, practitioner, education, mixed, etc.)

The times cited rate of *JELIS* articles prior to and after open access will be benchmarked. We will use MS Excel software for data analysis. A report of a small pilot is included as an attachment and thirteen articles from the 1996 *JELIS* are openly available in DLIST.

JELIS & LIS Faculty User Studies: In Year 2 of the project, we will survey LIS educators pre- open access and in conjunction with a DLIST self-archiving workshop. The workshop will train participants in self-archiving and use of DLIST; it will be held as a pre-conference workshop at four conferences (choosing from ALISE Annual Conference, Society of American Archivists Annual Meeting; *ACM Joint Conference on Digital Libraries* (JCDL), *Museums and the Web*, and *ASIST Annual Meeting*). Both a random sample of *JELIS* authors and all LIS faculty at ALA-accredited schools will be surveyed and invited to participate in the DLIST workshop. Our survey instrument will be a modified version from several of the studies that have been done on faculty behavior and OAA behavior [RoMEO; Brody et al]. For analysis we will use the ALISE LIS Disciplinary Areas Classification (this has 90 categories) to characterize authors and List of Journals in *ISI SSCI* and *JCR* to identify impact. In addition, the intellectual property rights categories we have derived from our current copyright study [Malone, et al, 2005] will be used to analyze self-archiving behaviors and answers to the questions about intellectual property concerns. Both the pre-post and post surveys will include a small knowledge test about intellectual property; like other OAA we are aware that intellectual property concerns are a barrier to scholarly self-archiving and we want to be sure that this does not continue to be so. We will be using an online survey service that we have used successfully in the past, SurveyMonkey, to conduct the online surveys, MS Excel for simple descriptive statistics, and Nvivo for qualitative software analysis.

Studying the impact of open access in LIS education using *JELIS*, DLIST, and LIS faculty, promises rich data that can serve as a model for similar studies in other disciplines. But even more importantly, it will help us understand much better the role and impact of LIS education in the overall development of American librarianship and information science, related careers and research agendas.

DLIST User and Usage Studies: During all three years we will gather data about DLIST users and usage. Currently, DLIST is using Webalyzer to log transactions. This will clearly not be sufficient as log data reports of hits, sessions, and visits, need to be 'cleaned' in compliance with established web metrics [Coleman and Neuhaus, 2004]. We are requesting computer support for this part of data gathering, customized reporting and cross-tabulations with other data gathered. We have done a preliminary analysis of DLIST user registration data and this is included in the DLIST Fall Report and can serve as an example of our analysis with the exception of discipline categories (as noted above, we will use the ALISE LIS disciplinary areas of classification scheme).

4. Project Resources: Budget, Personnel, and Management Plan

Budget: The largest part of the budget is for personnel (2 research investigators, 1 instructional librarian, 1 full-time computer staff (system administration) person, and 3 student assistants) and workshops (four workshops in Year two of the project plus attendance at IMLS OBE meetings in Washington D.C.). The staff time to be devoted to the activities described above is based on the past experiences of the investigators with citation studies, user studies, and DLIST since 2002. Details regarding allocation of personnel time and other expenses are provided in the budget justification.

Contributions: The University of Arizona will contribute a computer, printer, office space for the student assistants, 20% time of the Project Director/Co-PI (C.K. Malone), Co-I (A.S. Coleman), Instructional Librarian (G. Forger) and miscellaneous other travel and services in the three years. These contributions represent approximately 28% of the project budget.

Personnel: Cheryl Knott Malone, Associate Professor, School of Information Resources and Library Science (SIRLS), University of Arizona, Tucson, AZ. A qualitative researcher, Cheryl's research interests span both access issues as well as impact; she has written widely in the area of how gender and race influence access to and use of information. She has researched the construction and revision of the Information Sector in the North American Industry Classification System and collaborated with the University of Arizona to assess the impact of the move toward all-electronic open-access government depositories. In 2003, Cheryl was appointed to the US Depository Library Council to the Public Printer and in 2005 Co-Editor (with Coleman) of the *Journal of Education for Library and Information Science.* She teaches graduate courses on Government information, social constructs of information, information literacy instruction, and online searching, and is an Affiliate with the Women's Studies Program at the University of Arizona.

Anita S. Coleman, is Assistant Professor, School of Information Resources and Library Science, University of Arizona, Tucson, AZ. Coleman's research interests and use of methods to solve LIS problems range widely from information behaviors (seeking and scholarly communication) to information organization. She is interested in triangulated studies with quantitative and qualitative data that try to understand human behaviors related to information technologies. Relevant recent writings in the area of scholarly communication and information behaviors include: on Open Access and DLIST in D-Lib Magazine, on use of citations and citation indexes for learning to appear in the Journal of the American Society for Information Science and Technology. Her Ph.D. in Library and Information Science is from the University of Illinois at Urbana-Champaign. Her doctoral dissertation, in keeping with another goal namely to blend LIS research and practices, explored both information work and the design of tools to support reference work. Her thesis for the Master's degree in Library and Information Science was a study on the use of monographs. Predictor variables such as publication date, accession date, and past use were investigated to verify bibliometric laws and findings.

Garry J. Forger, is Assistant Director of the Learning Technologies Center, University of Arizona, Tucson. Garry has worked in the information field for over 20 years and been involved in training faculty for most of this time. Garry has conducted workshops and provided presentations at international conferences, coordinates local and national meetings and provides outreach on a variety of educational technology initiatives. He has a background in historical and archaeological research and has worked in public libraries, medical informatics, academic information systems, metadata consulting, distributed learning and educational technology. He has published articles on environmental information on the internet, metadata standards and internet consumer health and is an active semi-professional photographer. Garry is a member of the Board of Directors for the federally funded Gateway to Educational Materials (GEM) and has also been intimately involved with GEM since it's inception.

Management Plan:

Who	What	How Much Time	When
Cheryl K. Malone	JELIS back issues Digitization (Editorial check and QA Editor)	3/12	Year 1
Anita S. Coleman	Benchmarking JELIS in WoS	3/12	Year 1
Garry J. Forger	DLIST Workshops (Modify design of existing *DLIST User Guide and Self-Archiving Workshop Manual* and supervise Support for DLIST including supervision of DLIST usage logs	3/12	Year 1
1 Computer support staff	DLIST systems administration, programming, and usage logs	12/12	Years 1, 2, 3
Anita S. Coleman	Pre-OA DLIST Workshop Survey Design, Administration (2); subsequent survey analysis	3/12	Year 2
Cheryl K. Malone	Pre-OA DLIST Workshop Survey Design, Administration (2); subsequent survey analysis	3/12	Year 2
Garry J. Forger	Conduct DLIST workshops at four (4) conferences	4/12	Year 2
Cheryl K. Malone	Post-OA DLIST Study Design, Administration & Analysis & Cross-Tabulations	3/12	Year 3
Anita S. Coleman	JELIS OA citation study & cross-tabulations	3/12	Year 3
Student assistants	Assist in above tasks	3 at 12/12	Years 1, 2, 3

5. Dissemination

Dissemination of the findings of this study will be fourfold: 1) a technical report to be published by the University of Arizona School of Information Resources and Library Science; 2) presentation at appropriate scholarly and professional conferences; 3) publication in respected scholarly and professional journals; and 4) self-archiving in DLIST. The two investigators have strong track records in publishing in the LIS literature.

6. Sustainability

DLIST was started in 2002 with funds from the University of Arizona Proposition 301 Program to buy the server (approx. $ 4,000). In 2002, 2003, and 2004 the Arizona Health Sciences Library donated networking and technical support (approx. $ 20, 000 total over 3 years). In 2004, DLIST received yet another infusion of funds from the University of Arizona, Prop 301 to set up a research lab for investigating human uses of digital repositories, the JELIS pilot digitization, set up the DLIST Advisory Board, and investigate services such as copyright research, deposit, and metadata creation (approx. $21,000 for three student assistants). Additional funds were also contributed by SIRLS ($ 7,000 for a student). Since inception (DLIST was established as a service initiative) Coleman's time on DLIST has always been donated and Malone's time since she joined the project has also been donated. In 2005, DLIST covered the ALISE 2005 conference and collected all presentations (when permissions were given and when electronically available) for open access – 25 presentations are already available for open access.

The School of Information Resources and Library Science (SIRLS) is committed to maintaining DLIST and funding at the end of the grant period the Computer support staff associated with DLIST day-to-day systems administration and programming. One of the first tasks to our new DLIST Advisory Board is to help us identify sustainability options (see attached DLIST Fall Report for List of Advisory Board Members). We are also actively exploring partnerships with ARL, NSDL EIESC, a LIS journal publisher, and services for academic LIS units. We plan to hire a business major student to write a business plan for DLIST and hope that sustainable solutions will emerge out of these diverse activities and identify viable long-term sources of revenue for DLIST.

Conclusion

The impact of open access is an extremely important research area that has not been addressed by the disciplinary community in North America who most legitimately can claim this domain as theirs: LIS faculty. As noted earlier there has been no citation study of JELIS and there have only been three major studies in the area of open access. None of the three studies focused on the small but critical sub-discipline of LIS education scholarship. The findings of this research will benefit LIS faculty, information policy makers, librarians and publishers – anybody who is interested in the open access phenomenon of the 21st century as well as everybody who cares about LIS education.

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